NEW GOLD RAINY RIVER MINE
APPENDIX P
2017 DEER TISSUE REPORT

RAINY RIVER MINE

2017 WHITE-TAILED DEER
TISSUE SAMPLING REPORT

Prepared by:

Wood Environnent & Infrastructure Solutions
160 Traders Blvd. E., Suite 110
Mississauga, Ontario
L4Z 3K7

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Principal Contact: Sylvie St-Jean, Environmental Manager
New Gold Rainy River Mine
5967 Highway 11/71
P.O. Box 5
Emo, Ontario, Canada, P0W IE0
Telephone: (807) 482-0900
E-mail: Sylvie.St.Jean@newgold.com

EXECUTIVE SUMMARY

New Gold Inc. (New Gold) is currently constructing and operating, and eventually plans to reclaim a new open pit and underground gold mine in Chapple Township, Ontario. As part of commitments made during the environmental approvals process, New Gold conducted a second White-tailed Deer tissue and organ sampling program in 2017 to determine concentration levels of various contaminants such as metals (e.g., cadmium, copper and zinc) and cyanide within deer located near the Rainy River Mine (RRM). This, in addition to future sampling conducted will aid in determining exposure and ecological risk to wildlife, if any, from RRM related contaminants. The study will also assist in determining if there are risks to humans that consume local wildlife.

Sampling kits were distributed by New Gold RRM to collect deer tissue and liver samples from hunters on a voluntary basis. Tissues were also sampled from three deer that died from vehicle collisions, and liver tissue only was sampled from one deer which was killed by an unidentified poacher (a pile of viscera was found just north of the RRM on Richardson Road). There was no harvesting of deer solely for the purpose of this program to the knowledge of RRM. Samples from 36 deer were analyzed for several metals and 30 of those were analyzed for cyanide as well. A Spearman Correlation test was completed on each of the tested parameters to determine if there was a significant relationship between the contaminant concentration and the distance from the RRM. A Kruskal-Wallis test was completed on the 2016 and 2017 datasets to determine if the sample concentrations for each of the parameters differed significantly between the data collection years.

As seen in in the various graphs presented in this report, none of the contaminants exhibited a statistically significant relationship between concentration levels and proximity to the RRM boundary. This is likely attributable to the high variances associated with most of the parameters measured, whereby the standard deviations ranged from 0 to 793 3g/kg ww.

Most potential contaminant concentration levels did not differ significantly from the baseline data. However, arsenic, bismuth, cesium, copper, lithium, and magnesium concentration levels did exhibit significant differences ($P<0.05$) from the 2016 baseline concentration levels for those parameters.

There are very few similar studies in Canada or in North America which provide contaminant information from healthy White-tailed Deer populations that can be used as a baseline comparison for this study. It is also difficult to make comparisons at large geographic scales (e.g., outside Ontario or outside of Canada) as different ecological factors and human activities can result in different contaminant concentrations between populations. Accordingly, New Gold will use the 2016 data as baseline data for comparisons of concentration levels in deer tissue in future years (e.g., after operations have commenced and post-closure), rather than relying on comparisons to contaminant concentration levels in other studies.

newgold Rainy River Project

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1.0 INTRODUCTION

1.1 Project Background

New Gold Inc. (New Gold) is currently operating an open pit gold mine producing doré bars (gold with silver) for sale. Construction of the underground gold mine is in progress, with future plans to reclaim both the open pit and underground operational areas (Figure 1-1).

Physical works related to the RRM consist primarily of:

- Open pit;
- Underground mine (under construction);
- Overburden, mine rock and low-grade ore stockpiles;
- Primary crusher and process plant;
- Tailings management area;
- 230 kilovolt transmission line;
- Relocation of a portion of gravel-surfaced Highway 600; and
- Associated buildings, facilities and infrastructure.

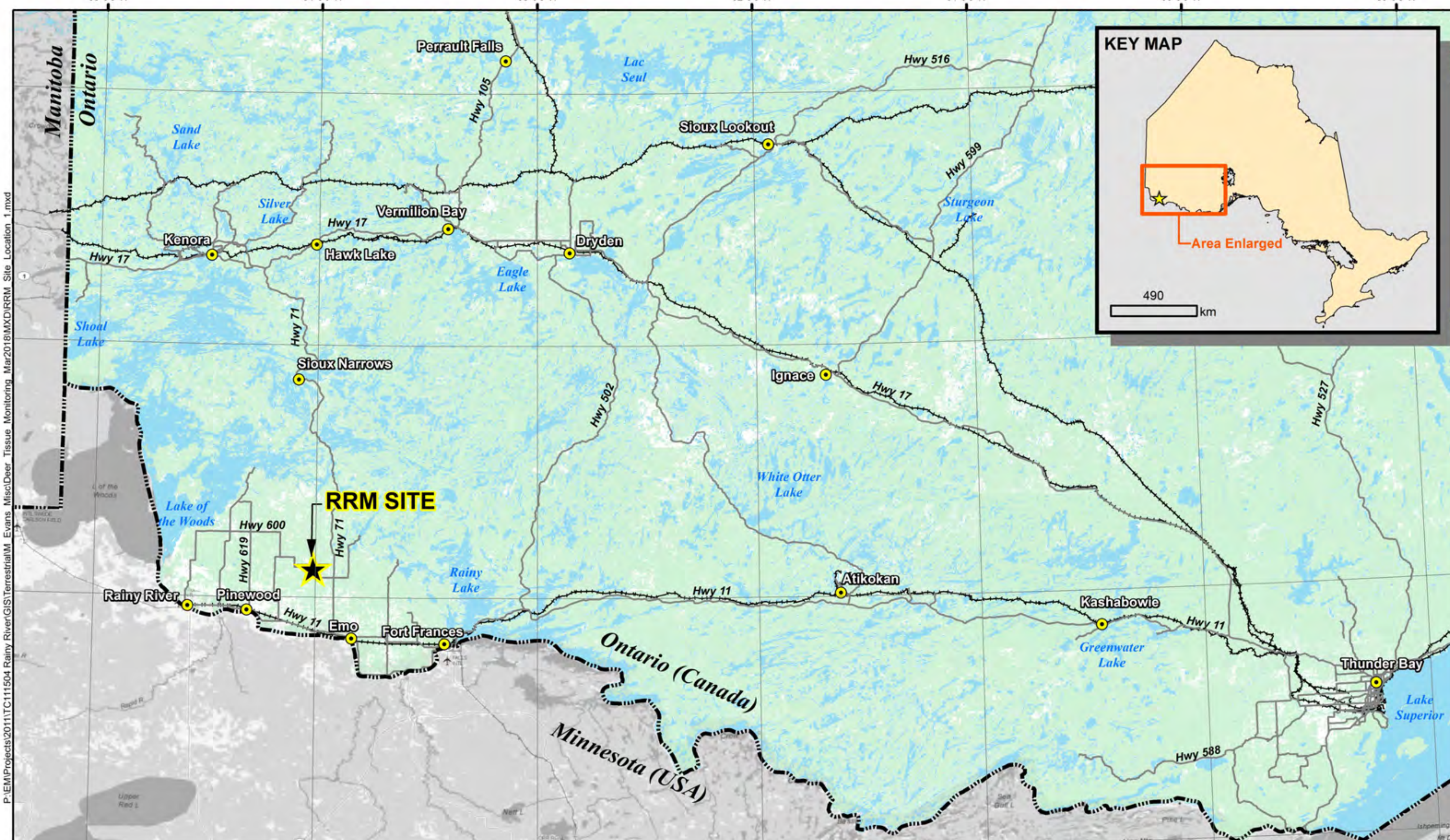
Development of the RRM was initiated in 2015 following completion of the Environmental Assessment process and receipt of applicable environmental approvals. In accordance with the *Canadian Environmental Assessment Act, 2012* (CEAA, 2012) a follow-up monitoring plan was developed to verify the accuracy of the predictions made in the Environmental Assessment about the impacts of the RRM on wildlife and wildlife habitat, and to monitor the effectiveness of rehabilitation efforts for wildlife habitat and terrestrial environments.

As part of the overall follow-up monitoring plan, and to address concerns that dust from the project will settle on the vegetation deer will be eating (and thus carry the contaminants up the food chain) New Gold RRM committed to a White-tailed Deer (*Odocoileus virginianus*) tissue and organ sampling program. This program will determine exposure and ecological risk to wildlife from mine-related contaminants and confirm the low risks to humans that consume local wildlife.

1.2 Objective and Scope

Metals such as cadmium, copper and zinc are naturally-occurring in the environment but may also be released to the environment in an enhanced manner through anthropogenic activities. Plant-eating animals, such as deer, are susceptible to ingesting unnaturally high levels of contaminants by feeding in areas exposed to industrial activities. Plants can absorb metals from soil or become coated by microscopic airborne contaminants from dust and industrial emissions. Airborne contaminants can be carried long distances by winds before they are deposited at ground level, while dust generated along roads tends to remain more localized. This dust may have a more concentrated effect on nearby plants, and subsequently, on the animals that consume these plants. Both of these sources of contaminants have the potential to harm the health of the animals that consume affected plants, as well as potentially the health of humans who consume these animals.

Preliminary results of the tissue sampling for the White-tailed Deer population located to close to the RRM are presented in this report. These data have been compared to the 2016 study results to aid in determining exposure and ecological risk to local wildlife from mine-related contaminants and assessing the risks to humans that consume local wildlife if any.



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LEGEND

- RRM Site
- Regional Communities
- Provincial / National Border
- Regional Road / Highway
- Railway

NOTES:
- Ontario base data extracted from Land Information Ontario (MNR) data warehouse, Queen's Printer for Ontario, 2011-2012
- Base data outside of Ontario extracted from ESRI DeLorme World Basemap

newgold Rainy River Project wood.

RAINY RIVER MINE

Project Site Location

Datum: NAD83
Projection: UTM Zone 15N

N W E S

PROJECT N°: TC111504 | **FIGURE: 1-1**

SCALE: 1:1,800,000 | DATE: June 2018

0 25 50 100 150 200 250 Kilometres

2.0 METHODOLOGY

2.1 Sample Collection

A tissue collection program was developed by New Gold in 2016 to test for metal and cyanide concentrations in White-tailed Deer. Sampling kits were provided to interested parties in 2016. Sampling kits were again distributed to interested parties during the 2017 deer hunting season to collect liver and muscle tissue samples from hunters on a voluntary basis. Tissues were also sampled from three deer that died in vehicle collisions (D004, D009, and D027) and liver tissue only was sampled from one deer which died in an unknown manner (D028; a pile of viscera was found just north of the RRM on Richardson Road). There was no harvesting of deer solely for the purpose of this program to the knowledge of New Gold RRM. Tissue and organ samples were collected from 36 deer at harvest locations shown in Figure 2-1.

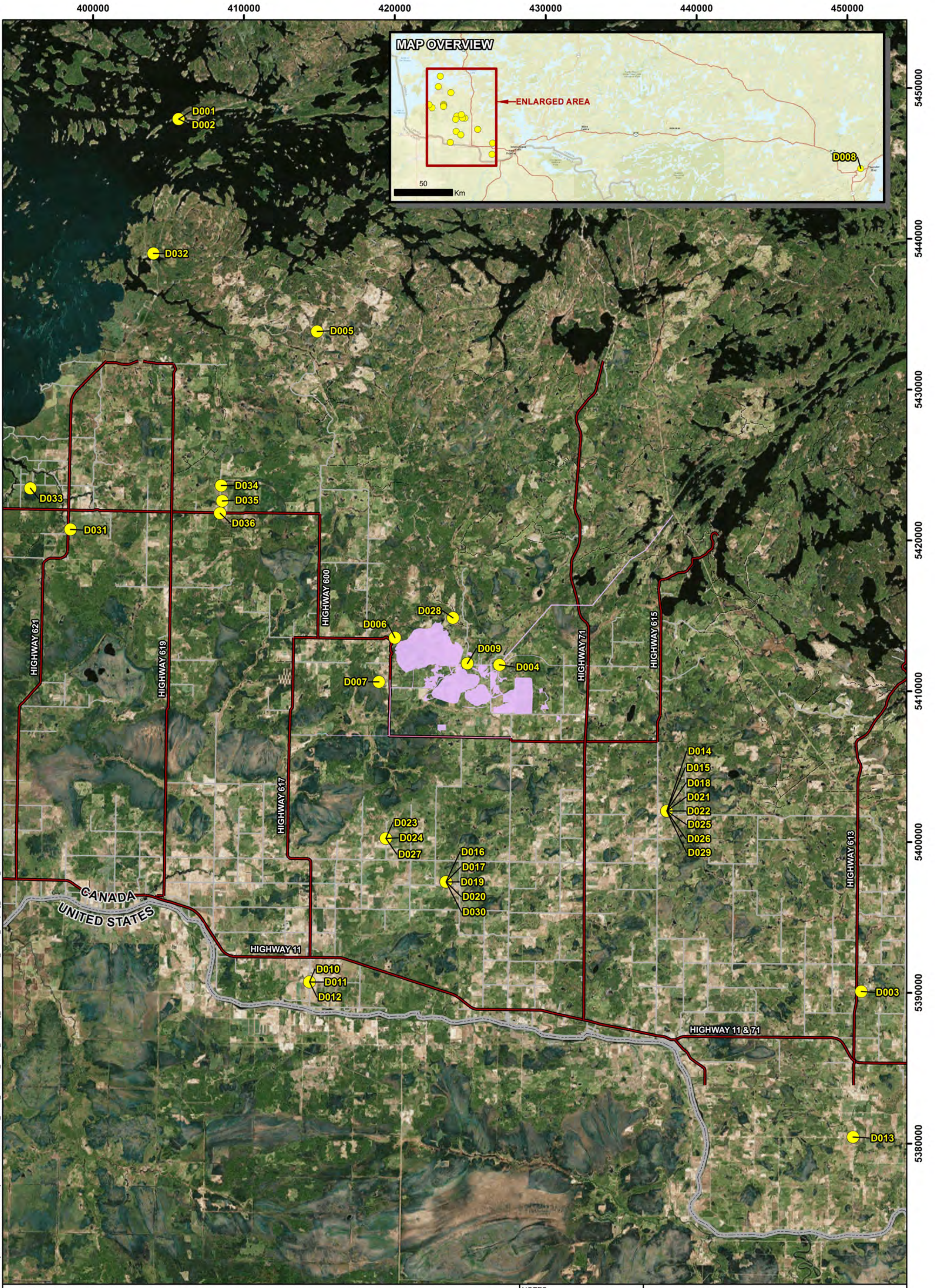
Detailed information about each animal the samples were collected from was collected, including:

- Date harvested;
- Weather;
- Name and contact details of sample provider;
- Location of harvest;
- Tag number;
- Deer sex, age and physical condition;
- Time of harvest and time of sample collection;
- Type of harvest (firearm or crossbow);
- Location of shot (injury); and
- Any additional comments.

Table 2-1 provides the sample identification number with the relevant sex, age and type of harvest for the specimens described in this report.

2.2 Analyses

Construction of the RRM began in the winter of 2015, and operations and production started in mid-2017. Consequently, the 2017 data presented in this report represent early operational data levels for the local deer population. The 2017 data will be compared herein to the baseline data levels collected in 2016. Tissue and organ sample collection will be conducted again in 2018, and then planned for every three years through the operations phase until the closure of the RRM. If contaminant levels are found to increase problematically, the frequency of the program will be changed to annual sampling and mitigation measure will be determined and implemented. The results of these future sampling periods will also be compared to the 2016 baseline levels.



LEGEND

- 2017 Deer Tissue Sampling Locations
- Approximate Principal RRM Facilities
- Highway
- Local Road
- Resource / Recreation Road
- Provincial Border

0 2.5 5 10 15 20 25 30 Kilometres

NOTES:
- Imagery extracted from ESRI.
- Road data extracted from Land Information Ontario, Ontario Road Network, MNRF

Datum: NAD83
Projection: UTM Zone 15N

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RAINY RIVER MINE

2017 Deer Tissue Sampling Locations

PROJECT N°: TC111504	FIGURE: 2-1
SCALE: 1:230,000	DATE: June 2018

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Table 2-1: White-tailed Deer Tissue Collection Data

Sample ID	Sex	Age	Type of Harvest
D001	Male	Unknown	Shot - Unknown
D002	Male	Adult	Shot - Unknown
D003	Male	Adult	Firearm
D004	Male	Fawn	Vehicle
D005	Male	Adult	Firearm
D006	Male	Adult	Firearm
D007	Male	Adult	Firearm
D008	Male	Adult	Bow
D009	Male	Fawn	Vehicle
D010	Male	Yearling	Firearm
D011	Female	Adult	Firearm
D012	Male	Yearling	Firearm
D013	Female	Adult	Firearm
D014	Female	Adult	Bow
D015	Male	Adult	Firearm
D016	Male	Adult	Firearm
D017	Female	Adult	Firearm
D018	Male	Adult	Firearm
D019	Male	Adult	Firearm
D020	Male	Adult	Firearm
D021	Female	Adult	Bow
D022	Male	Yearling	Firearm
D023	Male	Fawn	Firearm
D024	Female	Adult	Shot - Unknown
D025	Male	Adult	Firearm
D026	Male	Adult	Firearm
D027	Male	Adult	Vehicle
D028	Unknown	Unknown	Unknown
D029	Female	Unknown	Bow
D030	Male	Adult	Firearm
D031	Male	Yearling	Firearm
D032	Male	Adult	Firearm
D033	Male	Adult	Firearm
D034	Female	Yearling	Firearm
D035	Female	Adult	Firearm
D036	Male	Adult	Firearm

2.3.1 Chemical Analyses

Deer tissue and organ samples were sent to ALS Environmental Labs in Mississauga, Ontario for metal and cyanide analysis. Liver samples were analyzed for a suite of metals and muscle tissue was analyzed for cyanide. All metals other than mercury were tested for using an Inductively Coupled Plasma Mass Spectrometry (ICPMS) test (wet). Mercury was tested for using a Cold Vapour Atomic Fluorescence Spectroscopy (CVAFS) test (wet). The tests for metals were conducted following the British Columbia Lab Manual method described in *Metals in Animal Tissue and Vegetation (Biota) – Prescriptive*. Tissues samples were homogenized and sub-sampled prior to hotblock digestion with nitric acid, hydrochloric acid and hydrogen peroxide. For the ICPMS, analysis was by collision cell inductively coupled plasma – mass spectrometry, modified from United States Environmental Protection Agency (US EPA) Method 6020A. The CVAFS analysis uses atomic fluorescence spectrophotometry or atomic absorption spectrophotometry, adapted from US EPA Method 245.7.

2.3.2 Statistical Analyses

Low concentrations of contaminants cannot always be precisely measured. Concentrations that are too low to be measured are said to be below the Lowest Detection Limit (LDL) and as such range from 0 to the LDL value itself. In statistical analyses these values are often substituted with a constant value such as the LDL, half of the LDL, or 0. For the purposes of this study, concentrations that were below the LDL were assumed to be 0.

Statistics were calculated using Systat 13® software. Descriptive statistics, such as mean, maximum, minimum, median, and standard deviation values were calculated for each potential contaminant analyzed in this study. Descriptive statistics of skewness and kurtosis were used to assess data normality. Log-transformations were unsuccessful in normalizing the data sets. Consequently, non-parametric statistical testing was used. The Spearman correlation analysis was completed to determine the strength and direction of the relationship between the analyte concentration and the distance from the RRM, expressed as the Spearman Rho statistic (r_s). The Spearman correlation analysis was selected since there is no requirement for normality. The r_s absolute values range between 0 and 1, whereby the closer the r_s is to 0, the weaker the relationship. Directionality of the relationship is inferred by either a positive or negative r_s. Consequently, an increase in the contaminant concentration with increased distance from the RRM would be expressed as a positive r_s, while a decrease in concentration of a contaminant with increased distance from the RRM would be expressed as a negative r_s. The following distinctions between r_s ranges were used in this study to describe the strength of the relationship between the analyte and the distance from the RRM:

r_s = 0.00-0.19 indicates a very weak relationship;
r_s = 0.20-0.39 indicates a weak relationship;
r_s = 0.40-0.59 indicates a moderate relationship;
r_s = 0.60-0.79 indicates a strong relationship; and
r_s = 0.80-1.0 indicates a very strong relationship.

No test for significance was performed on the r_s values since all of the relationships between analyte and distance from the RRM were interpreted as very weak or weak.

The nonparametric Kruskall-Wallis test was completed to compare the 2017 parameter concentrations with those recorded in 2016 ($P<0.05$).

3.0 RESULTS

Raw data for each contaminant and each sample as analyzed by ALS Environmental Labs are presented in Appendix A.

3.1 Sample Collection

Due to the nature of the study (e.g., samples were provided voluntarily by hunters) there was no control over the locations, or the distribution of locations, from which the 36 deer samples were collected. Many of the animals were harvested within 20 km of the RRM boundary and are distributed in a useful pattern for analysing distances from the RRM boundary:

- 14% of the samples were collected within 5 km of the boundary;
- 58% were collected within 10 km; and
- 75% were collected within 20 km of the boundary.

More distant samples were taken between 21 km and 37 km from the Project boundary as well as the furthest sample which was taken approximately 335 km from the Project boundary.

Samples D019 and D030 were harvested near mineral troughs for cattle, and in many cases in the results below, D019 and D030 have elevated concentrations; it is possible that the source of these elevated concentrations is from foraging in the cattle mineral troughs.

3.2 Concentrations of Contaminants

Most the potential contaminants tested were detected in the tissue samples (Table 3-1). The exceptions were beryllium and bismuth, which were below the LDL for all of the 2017 samples analyzed. On average, 34.3% of the samples fell below the LDL for the potential pollutants tested.

Descriptive statistics are presented in Table 3-1, with the mean, median, maximum, minimum, standard error (SE), standard deviation (SD), skewness, and kurtosis for each of the potential contaminants. Approximately 30.3% of the datasets did not conform to the assumptions of normality and attempts at log transformations were unsuccessful at normalizing these data. Consequently, non-parametric testing was used to assess relationships within and between datasets. Figure 3-1 illustrates potential contaminant concentrations found in the 36 deer samples from the RRM The samples have been plotted relative to the distance between the deer tissue harvest location (Figure 2-1) and the boundary of the RRM. The relationship between contaminant concentration and distance to the RRM is discussed in Section 3.2.

Slightly more than one third (36.4%) of the potential contaminants differed significantly ($P<0.05$) from their 2016 baseline concentrations (Table 3-2). The small sample sizes (n=38 in 2016 and n=36 in 2017) and lack of baseline metal contamination values for White-tailed Deer in literature make it difficult to clearly demonstrate expected normal values. Trends in contaminant concentration levels will become clearer as more data are collected in subsequent years.

A comparison between the 2016 and 2017 contaminant concentrations revealed that approximately 37% of the 2017 parameter concentrations differed significantly ($P<0.05$) from the baseline concentrations measured in 2016 (Table 3-2). Concentrations of arsenic, bismuth, cesium, copper, lithium, mercury, nickel, rubidium, selenium, strontium, and cyanide concentrations were significantly lower in the tissue samples compared with the 2016 baseline concentrations for those analytes. Only sodium concentrations were significantly higher than the 2016 baseline concentrations. With limited samples (n=38 in 2016 and n=36 in 2017) resulting in large variations, any inferences to causation would be speculative. As mentioned above, trends are expected to become established with the collection of more data during subsequent sampling rounds.

The results for each contaminant are discussed briefly below with a brief comparison to 2016 baseline data.

Aluminum

Aluminum is the most abundant metal in the earth's crust and is found commonly in bedrock and unconsolidated surficial sediments/soil as well as groundwater and can be introduced into the environment by burning coal (United States Department of the Interior 2016; Agency for Toxic Substances and Disease Registry 2017). Aluminum is found to be locally elevated naturally in surface water both on and off the RRM site (personal communication with Nathan Baird).

Aluminum has a LDL of 0.40 milligrams per kilogram wet weight (mg/kg ww). Most of the 2017 values for this metal in deer tissues for the RRM study were near the LDL for aluminum, with 61.1% of the samples having non-detectable levels (the value is less than the LDL). The highest aluminum concentrations are 2.63 mg/kg ww, 3.63 mg/kg ww and 4.22 mg/kg ww from samples D018, D028 and D020, respectively.

Results of the Kruskal-Wallis test indicate that aluminum concentrations did not differ significantly between 2016 and 2017 deer tissue samples ($P=0.447$).

Antimony

Antimony is naturally present in the earth's crust in bedrock, soil and waterbodies (i.e., lakes and rivers) although it is generally found in low concentrations (Agency for Toxic Substances and

Disease Registry 2017; United States Department of the Interior 2016). Antimony can also enter the environment through various human activities including: coal-fired power plants, copper smelters and inorganic chemical plants (CCREM nd).

Antimony has a LDL of 0.002 mg/kg ww and most of the samples contained concentrations of this element at or below the LDL (i.e., 88.9% less than the LDL). The remainder of the concentrations in the samples ranged from 0.0025 mg/kg ww to 0.0061 mg/kg ww which are considered to be low (close to the LDL).

Results of the Kruskal-Wallis test indicate that antimony concentrations did not differ significantly between 2016 and 2017 deer tissue samples (P=0.075).

Arsenic

Arsenic is a widely distributed element found naturally in the earth's crust in soil and minerals and the largest natural source of arsenic entering surface waters is that from weathered rocks and soils (Nriagu 1989 in CCME 2017). Arsenic is used in metallurgical applications, wood preservatives, herbicides, pharmaceutical and glass manufacturing (Government of Canada 1993). As arsenic was historically widely used in pesticides, agricultural areas where it was used can have high levels in soils (United States Department of the Interior 2016; Agency for Toxic Substances and Disease Registry 2017).

The LDL for Arsenic is 0.004 mg/kg ww; 75.0% of the samples in this study had concentrations less than the LDL and the remainder of the concentrations in samples ranged from 0.004 mg/kg ww to 0.022 mg/kg ww. Two samples (D004 and D017) had relatively high concentrations (i.e., within the highest 25th percentile) of 0.0220 mg/kg ww, and 0.0175 mg/kg ww, respectively.

Results of the Kruskal-Wallis test indicate that arsenic concentrations were significantly lower in the 2017 deer tissues samples compared with the 2016 baseline concentrations (P=0.000).

Barium

Barium is found naturally in some rocks and soils, and can be introduced to air and water by natural weathering processes. Some vegetation types are known to accumulate barium. Barium minerals and compounds are widely used in industry. Barium is used as a filler in such anthropogenic substances such as: paint, bricks, glass, rubber and insect / rodent poisons, and could enter the environment from the manufacturing or disposal of these products (United States Department of the Interior 2016; Agency for Toxic Substances and Disease Registry 2017).

All of the deer tissue samples had detectable levels of barium (LDL of 0.01 mg/kg ww), ranging from 0.016 mg/kg ww to 0.105 mg/kg ww. The highest barium concentration values are 0.105 mg/kg ww, 0.082 mg/kg ww, and 0.078 mg/kg ww from samples D019, D020, D001, respectively.

Results of the Kruskal-Wallis test indicate that barium concentrations did not differ significantly between 2016 and 2017 deer tissue samples (P=0.452).

Beryllium

Beryllium occurs naturally in some rocks including coal and soil, although generally in low levels in Canada (CCREM nd). Natural weathering of soil and rocks causes it to enter water sources and it can accumulate in some plants. It is also released into the environment when coal or oil are burned or improperly disposed of (United States Department of the Interior 2016; Agency for Toxic Substances and Disease Registry 2017).

There were no 2017 samples with beryllium concentrations above the respective LDL of 0.002 mg/kg ww.

Results of the Kruskal-Wallis test indicate that beryllium concentrations did not differ significantly between 2016 and 2017 deer tissue samples (P=1.000).

Bismuth

Bismuth is a naturally occurring metal in the earth's crust. Bismuth can be released into soil and water by natural weathering processes (Salminen et al. 2005).

There were no samples with bismuth above the respective LDL of 0.002 mg/kg ww.

Results of the Kruskal-Wallis test indicate that bismuth concentrations were significantly lower in the 2017 deer tissue samples compared with the 2016 baseline concentrations (P=0.000).

Boron

Boron is a widely occurring metal in the earth's crust. Due to the extensive occurrence of boron in clay-rich sediments and sedimentary rocks, most boron found in surface soils and waters results from weathering of natural sources. Boron can accumulate in some plants. Boron is also widely used in fertilizers and pesticides so agricultural areas can have high levels in the soils (Agency for Toxic Substances and Disease Registry 2017).

Boron has a LDL of 0.2 mg/kg ww. Almost half (47.2%) of the tissue samples had non-detectable concentration levels of boron, with the remaining values ranging from 0.21 to 0.35 mg/kg ww.

Results of the Kruskal-Wallis test indicate that boron concentrations did not differ significantly between 2016 and 2017 deer tissue samples (P=0.242).

Cadmium

Cadmium occurs naturally in rocks including coal and petroleum, and can enter water or soil when it is broken down by acidic water such as acid precipitation. Some areas naturally contain elevated concentrations of cadmium in underlying rock, with the spatial variation related to both rock composition and other natural processes. As cadmium is used in such items as batteries, plastics and pesticides (CCME 2017), it can also enter the environment from anthropogenic means including from landfills or incineration. Cadmium is known to accumulate in plants, including agricultural crops although the uptake rates will depend on the plant species (United States Department of the Interior 2016; Agency for Toxic Substances and Disease Registry 2017; CCME 2015).

All of the deer tissue samples had detectable levels of cadmium (LDL of 0.001 mg/kg ww), ranging from 0.0011 mg/kg ww to 1.89 mg/kg ww. The four highest cadmium concentrations reported were 1.89 mg/kg ww (sample D008), 1.59 mg/kg ww (sample D036), 1.2 mg/kg ww (sample D006) and 1.16 mg/kg ww (sample D017).

Results of the Kruskal-Wallis test indicate that cadmium concentrations did not differ significantly between 2016 and 2017 deer tissue samples (P=0.087).

Calcium

Calcium is the third most abundant metal in the earth’s crust and can be found naturally in rocks, minerals, and in all plants and animals. It is readily soluble in water and as a result, enters the environment through the weathering of rocks, especially limestone (CCREM nd).

All of the deer tissue samples from the RRM had detectable levels of calcium (LDL of 4 mg/kg ww), ranging from 12.7 mg/kg ww to 76.4 mg/kg ww. The lowest concentration of 12.7 mg/kg ww is considerably lower than the rest of the values.

Results of the Kruskal-Wallis test indicate that calcium concentrations did not differ significantly between 2016 and 2017 deer tissue samples (P=0.143).

Cesium

Cesium occurs naturally in rocks, soil and mineral and can enter water and air by natural erosion and weathering processes. Anthropogenic sources of cesium include nuclear power plants and other nuclear operations (Agency for Toxic Substances and Disease Registry 2017).

Cesium has a LDL of 0.001 mg/kg ww. All of the samples had detectable levels of cesium, ranging from 0.0024 mg/kg ww to 0.104 mg/kg ww. The maximum result of 0.104 mg/kg ww (D030) is substantially higher than then the next highest concentration detected of 0.73 mg/kg ww (D036).

Results of the Kruskal-Wallis test indicate that cesium concentrations in the 2017 deer tissues were significantly lower compared with the 2016 baseline concentrations (P=0.009).

Chromium

Chromium us a naturally occurring element in rocks, soil, water, air, plants and animals. In rocks and soil, it is generally found as an insoluble oxide (CCME 2017). Anthropogenic sources of chromium in the environment include fossil fuel combustion, cement manufacturing, incineration and from industries such as ferrochromium production and electroplating (United States Department of the Interior 2016; Agency for Toxic Substances and Disease Registry 2017; CCME 2017).

Chromium has a LDL of 0.01 mg/kg ww. Most (i.e., 83.3%) of the deer tissue samples had detectable concentration levels of chromium, with values ranging from 0.01 mg/kg ww to 0.36 mg/kg ww. The highest concentrations of chromium were detected in D017, D018, and D022, with concentrations measuring 0.36 mg/kg ww, 0.31 mg/kg, and 0.33 mg/kg, respectively.

Results of the Kruskal-Wallis test indicate that chromium concentrations did not differ significantly between 2016 and 2017 deer tissue samples (P=0.317).

Cobalt

Cobalt occurs naturally in many rock types, and accordingly, is present in soil, water, plants and animals. Anthropogenic sources of cobalt in the environment including coal burning, other industries, fertilizers, and vehicle exhaust (CCREM nd; Agency for Toxic Substances and Disease Registry 2017).

All but two of the deer tissue samples (94.4%) had detectable concentrations of cobalt (LDL of 0.004 mg/kg ww). Concentrations of cobalt in the deer tissue samples ranged from 0.0041 mg/kg ww to 0.0943 mg/kg ww. While most of the samples had similar concentrations of this element, elevated cobalt concentrations were detected in several samples. Samples D013 and D036 exhibited the levels of cobalt in their tissues, with samples reaching concentrations of 0.0943 mg/kg ww and 0.0806 mg/kg ww, respectively.

Results of the Kruskal-Wallis test indicate that cobalt concentrations did not differ significantly between 2016 and 2017 deer tissue samples (P=0.600).

Copper

Copper is a common, naturally occurring metal in rocks and minerals of the earth's crust and is found in surface soil, water, sediments, air, plants and animals. Major industrial sources include copper mining, smelting and refining industries, wire mills, coal-burning industries, and iron- and steel-producing industries (CCREM nd). As well as from industrial discharges and emissions, copper also enters the environment naturally from decaying plants and forest fires (United States Department of the Interior 2016; Agency for Toxic Substances and Disease Registry 2017).

All of the tissue samples had detectable levels of copper, ranging from 0.574 mg/kg ww to 173 mg/kg ww (LDL of 0.020 mg/kg ww). Only four of the 36 samples (11.1%) had copper concentrations below 4 mg/kg ww (D016, D019, D020, and D032). The highest concentrations measured were from samples D007, D013, and D017, with copper concentrations of 173 mg/kg ww, 101 mg/kg ww, and 100 mg/kg ww, respectively.

Results of the Kruskal-Wallis test indicate that copper concentrations were significantly lower in the 2017 deer tissue samples compared with the 2016 baseline concentrations (P=0.012).

Iron

Iron is a naturally occurring metal found in minerals and is the fourth most abundant element in the earth's crust. It is released into soil and water by the natural weathering of rocks and is commonly present. Iron can also be introduced into the environment from human activities, including from burning of coal, acid mine drainage, mineral processing, landfill leachates, iron-related industries, and the corrosion of iron and steel (CCREM nd).

All of the deer tissue samples from the RRM had detectable levels of iron (i.e., >0.6 mg/kg ww), ranging from 49.3 mg/kg ww to 990 mg/kg ww. The two highest concentrations (871 mg/kg ww and 990 mg/kg ww, samples D019 and D032, respectively) were substantially higher than the next highest value of 396 mg/kg ww (D016).

Results of the Kruskal-Wallis test indicate that iron concentrations did not differ significantly between 2016 and 2017 deer tissue samples (P=0.709).

Lead

Lead is a naturally occurring metal in the earth's crust. Most of the lead in the environment however, comes from human activities rather than the weathering of lead-containing rock (CCREM nd). The historic use of gasoline and pesticides containing lead caused large amounts to enter the environment. Lead binds to soil and will stay in an area for many years. Other sources of lead in the environment are burning fossil fuels, incineration, leaching from plumbing and weathering of paint (Agency for Toxic Substances and Disease Registry 2017).

The LDL for lead is 0.0040 mg/kg ww and 38.9% of the samples had non-detectable levels of lead. The remainder of the results range from 0.0046 mg/kg ww to 0.131 mg/kg ww. The highest lead concentration levels were recorded in samples D002, D011, and D030, with concentrations measuring 0.131 mg/kg ww, 0.0655 mg/kg ww, and 0.0354 mg/kg, respectively

Results of the Kruskal-Wallis test indicate that lead concentrations did not differ significantly between 2016 and 2017 deer tissue samples (P=0.157).

Lithium

Lithium naturally occurs in rocks and can be introduced to water and soils by natural weathering processes. Human activities also introduce lithium into the environment such as through the disposal of batteries, as well as coal combustion and aluminum product production (Salminen et al. 2005; Yalamanchali 2012; CCREM nd). Lithium compounds are readily soluble; and is easily taken up and accumulated in plants (CCREM nd; Yalamanchali 2012; Lenntech 2017).

Lithium has a LDL of 0.10 mg/kg ww. Fifty percent (50%) of the samples had non-detectable levels of lithium. The rest of the sample lead concentrations ranged from 0.11 mg/kg ww to 0.72 mg/kg ww. Four samples contained elevated lithium concentrations. D002, D003, D004, and D010 tissues contained 0.52 mg/kg ww, 0.59 mg/kg ww, 0.53 mg/kg ww, and 0.72 mg/kg ww of lead, respectively.

Results of the Kruskal-Wallis test indicate that lithium concentrations were significantly lower in the 2017 tissue samples compared with the 2016 baseline concentrations (P=0.003).

Magnesium

Magnesium is a common naturally occurring element in the earth's crust and is found in many different rock types, including dolomite which is commonly quarried and used as an aggregate. It is used in a variety of industry applications, including: textiles, paper, refractories, ceramics and fertilizers. Magnesium is considered to be an essential element for all organisms and may be accumulated in in calcareous tissues (CCREM nd).

All of the samples had detectable concentrations (i.e., >0.4 mg/kg ww) of magnesium ranging from 47.3 mg/kg ww to 325 mg/kg ww. The highest concentration of magnesium (325 mg/kg ww; D030) was substantially higher than the next highest concentration detected (205 mg/kg ww; D013). While 97.2% of the samples contained magnesium concentrations above 100 mg/kg ww, one sample (D019) contained only 47.3 mg/kg ww of magnesium in its tissue.

Results of the Kruskal-Wallis test indicate that magnesium concentrations did not differ significantly between 2016 and 2017 deer tissue samples (P=0.169).

Manganese

Manganese occurs naturally in mineral form from sediments and rocks, and is taken up and accumulated by some plants. As it is used in the steel and chemical industries, manganese can also be released from emissions and waste disposal (United States Department of the Interior 2016; Agency for Toxic Substances and Disease Registry 2017; CCREM nd).

All of the samples had detectable levels (LDL of 0.010 mg/kg ww) of manganese, ranging from 0.066 mg/kg ww to 4.35 mg/kg ww. D013, D023, and D027 yielded the highest manganese concentrations in their tissues, with concentrations of 4.05 mg/kg ww, 4.26 mg/kg ww, and 4.35 mg/kg ww, respectively.

Results of the Kruskal-Wallis test indicate that manganese concentrations did not differ significantly between 2016 and 2017 deer tissue samples (P=0.369).

Mercury

Mercury occurs naturally and enters soil, water and air by the weathering of minerals in rocks and soils (Agency for Toxic Substances and Disease Registry 2017). Mercury is also introduced into the environment from anthropogenic usage, including: the pulp and paper manufacture, combustion of coal, and disposal of medical and electrical equipment (Agency for Toxic Substances and Disease Registry 2017; United States Department of the Interior 2016; CCME 2017).

Mercury has a LDL of 0.0010 mg/kg ww. Four samples had non-detectable concentrations (i.e., <0.001 mg/kg ww) and the rest of the samples had concentrations ranging from 0.0014 mg/kg ww to 0.0114 mg/kg ww. The highest concentrations of mercury were detected in D004 and D017, with concentrations of 0.0114 mg/kg ww and 0.0109 mg/kg ww, respectively.

Results of the Kruskal-Wallis test indicate that mercury concentrations were significantly lower in the 2017 tissue samples compared with the 2016 baseline concentrations (P=0.000).

Molybdenum

Molybdenum occurs naturally in rocks, and the weathering of igneous and sedimentary rocks (especially shales) introduces molybdenum to the environment naturally. Molybdenum can also be released into the environment by combustion of fossil fuels and through waste products of industries using molybdenum (CCME 2017).

All of the samples in this study had detectable levels of molybdenum (LDL of 0.0040 mg/kg ww); with concentrations ranging from 0.0104 mg/kg ww to 0.866 mg/kg ww. Four samples contained molybdenum concentrations exceeding 0.8 mg/kg ww. D023, D024, D034, and D035 had molybdenum concentrations measuring 0.825 mg/kg ww, 0.81 mg/kg ww, 0.845 mg/kg ww, and 0.866 mg/kg ww, respectively.

Results of the Kruskal-Wallis test indicate that molybdenum concentrations did not differ significantly between 2016 and 2017 deer tissue samples (P=0.556).

Nickel

Nickel is mined commercially in Canada including in Ontario. Nickel is found naturally in soils and water through the weathering of bedrock and can accumulate in plants. Human activities such as such as burning fossil fuels can also cause nickel to be introduced into the environment, as well as waste from nickel industries such as electroplating, stainless steel and alloy production (Agency for Toxic Substances and Disease Registry 2017; United States Department of the Interior 2016).

Most (86.1%) of the tissue samples had nickel concentrations below the LDL of 0.040 mg/kg ww. The remainder of the samples had nickel concentrations ranging from 0.045 mg/kg ww to 0.076 mg/kg ww. Of the 36 samples, only D026 (0.076 mg/kg ww) was within the top 25% of the nickel concentrations measured.

Results of the Kruskal-Wallis test indicate that nickel concentrations were significantly lower in the 2017 tissue samples compared with the 2016 baseline concentrations (P=0.040).

Phosphorus

Phosphorus can be released into soil and water by natural weathering process of native bedrock, and is actively taken up by plants. Decomposition of these plants is another source of phosphorus to the environment, as well as such anthropogenic sources as fertilizers, pesticides and detergents (Lenntech 2017).

Phosphorus has a LDL of 2.0 mg/kg ww. All of the tissue samples had detectable levels of phosphorus ranging from 671 mg/kg ww to 4530 mg/kg ww. The minimum concentration of 671 mg/kg ww (D019) is substantially lower than the next lowest concentration of 1580 mg/kg ww.

Results of the Kruskal-Wallis test indicate that phosphorus concentrations did not differ significantly between 2016 and 2017 deer tissue samples (P=0.754).

Potassium

Potassium is found in nature as a mineral and is released into the environment by natural weathering processes although it is resistant to weather processes. Potassium is used widely in fertilizers and detergents which can also introduce this element into the environment (Lenntech 2017). Potassium is needed for all life and is found in all plants and animals. This element is readily accumulated (CCREM nd).

All of the deer tissue samples had detectable levels of potassium (LDL of 4.0 mg/kg ww), ranging from 2150 mg/kg ww to 4190 mg/kg ww. The potassium concentrations differed little between the samples and no elevated concentrations were detected.

Results of the Kruskal-Wallis test indicate that potassium concentrations did not differ significantly between 2016 and 2017 deer tissue samples (P=0.060).

Rubidium

Rubidium exists naturally in minerals and rocks and enters soil and water by natural weathering processes. Rubidium can also be introduced into the environment due to human activities, such as glass dust, however natural sources are considered more abundant (Salminen et al. 2005).

The LDL of rubidium is 0.010 mg/kg ww. All of the samples had detectable levels of rubidium ranging from 6.59 mg/kg ww to 37.5 mg/kg ww. The highest concentrations of rubidium were detected in D013, D019, D016, and D033, with concentrations measuring 25.4 mg/kg ww, 26 mg/kg ww, 24 mg/kg ww, and 37.5 mg/kg ww, respectively.

Results of the Kruskal-Wallis test indicate that rubidium concentrations were significantly lower in the 2017 tissue samples compared with the 2016 baseline concentrations (P=0.017).

Selenium

Selenium occurs naturally in rocks and soils, is easily taken up by plants, and can be introduced to the water and air by natural weathering processes and volcanic activity (CCREM nd). Selenium can also be released into the environment by the burning of coal and oil (Agency for Toxic Substances and Disease Registry 2017).

Selenium (LDL of 0.010 mg/kg ww) was detected in all of the samples, with concentrations ranging from 0.135 mg/kg ww to 1.85 mg/kg ww. The highest concentrations of selenium were detected in D007, D010, and D017 (1.85 mg/kg ww, 1.06 mg/kg ww, and 1.12 mg/kg ww, respectively).

Results of the Kruskal-Wallis test indicate that selenium concentrations did not differ significantly between 2016 and 2017 deer tissue samples (P=0.000).

Sodium

Sodium exists naturally exists in the earth’s crust, including as sodium chloride (salt) deposits. It is released into soils and waterbodies by weathering and leaching. Anthropogenic products and use in snow and ice control (sodium chloride) can also introduce sodium into the environment (United States Department of the Interior 2016; CCREM nd).

Sodium has a LDL of 4.0 mg/kg ww. All of the samples had detectable levels of sodium which ranged from 352 mg/kg ww to 1,510 mg/kg ww. The highest sodium concentrations were measured in D009, D021, D022, and D027, with sodium levels of 1,200 mg/kg ww, 1,510 mg, kg ww, 1,230 mg/kg ww, and 1,260 mg/kg ww.

Results of the Kruskal-Wallis test indicate that sodium concentrations were significantly higher in the 2017 tissue samples compared with the 2016 baseline concentration (P=0.048).

Strontium

Strontium is found in nature through the weathering of native rocks, and can accumulate in many plants. Strontium can be introduced into the environment by burning coal and oil (Agency for Toxic Substances and Disease Registry 2017).

Strontium has a LDL of 0.010 mg/kg ww. All samples had detectable levels of strontium, with concentrations ranging from 0.011 mg/kg ww to 0.317 mg/kg ww. The maximum value (0.317 mg/kg ww) was substantially higher than the rest of the sample values.

Results of the Kruskal-Wallis test indicate that strontium concentrations did not differ significantly between 2016 and 2017 deer tissue samples (P=0.012).

Tellurium

Tellurium exist naturally in coal and minerals though is quite rare (Lenntech 2017). Natural weathering processes introduce tellurium into soils (Salminen et al. 2005) from where it is taken up readily by plants (Lenntech 2017). Tellurium can be introduced into the environment as a by-product of copper and lead refining (P S Analytical 2015).

Tellurium has a LDL of 0.0040 mg/kg ww and all of the samples in this study were below this concentration level.

Results of the Kruskal-Wallis test indicate that tellurium concentrations did not differ significantly between 2016 and 2017 deer tissue samples (P=1.000).

Thallium

Thallium has a LDL of 0.00040 mg/kg ww. Over half (55.5%) of the samples had non-detectable thallium concentration levels. Concentration levels measured in the rest of the samples ranged from 0.00042 mg/kg ww to 0.00172 mg/kg ww. The maximum concentration of 0.00172 mg/kg ww (D030) is substantially higher than the rest of the sample concentrations.

Results of the Kruskall-Wallis test indicate that thallium concentrations did not differ significantly between 2016 and 2017 deer tissue samples (P=0.117).

Thallium is found naturally in soils, air and water as a result of weathering of native rocks, and is readily taken up by plants (Agency for Toxic Substances and Disease Registry 2017).

Tin

Tin also is found naturally in soil, air and water, and can be released to the environment from industrial discharges, steel manufacturing and municipal sewage as well as other anthropogenic sources (CCREM nd).

Tin has a LDL of 0.020 mg/kg ww. Seventy-two percent (72.2%) of the samples had non-detectable tin concentration levels. The concentrations of the remaining samples ranged from 0.022 mg/kg ww to 0.075 mg/kg ww. Two samples (D026 and D030) contributed to the top 25th percentile of the sample set, with concentrations of 0.05 mg/kg ww, and 0.075 mg/kg ww, respectively.

Results of the Kruskal-Wallis test indicate that tin concentrations were significantly lower in the 2017 tissue samples compared with the 2016 baseline concentrations (P=0.005).

Uranium

Uranium naturally occurs in rocks and can be readily mobilized by weathering and natural erosion (CCME 2017).

Uranium accumulates in plants, especially in the roots Uranium has a LDL of 0.00040 mg/kg ww. Four samples (11.1%) had detectable uranium concentration levels ranging from 0.00060 mg/kg ww to 0.00457 mg/kg ww. Only one sample (D026) contributed to the top 25th percentile of uranium concentrations, with 0.00457 mg/kg ww of uranium detected.

Results of the Kruskal-Wallis test indicate that uranium concentrations did not differ significantly between 2016 and 2017 deer tissue samples (P=0.326).

Vanadium

Vanadium is naturally occurring element present in the earth's crust in abundance, particularly with basic igneous rocks. It is released to soils, water and air by weathering processes. Anthropogenic sources of vanadium include air borne particles from oil and coal combustion, and steel production (CCREM nd).

Vanadium has a LDL of 0.020 mg/kg ww. Fifty-eight percent (58.3%) of the samples had non-detectable vanadium concentration levels and the rest ranged from 0.022 mg/kg ww to 0.236 mg/kg ww. Notably, the two highest concentration levels (0.202 mg/kg ww and 0.236 mg/kg ww) are substantially higher than the next highest concentration level (0.113 mg/kg ww).

Results of the Kruskal-Wallis test indicate that vanadium concentrations did not differ significantly between 2016 and 2017 deer tissue samples (P=0.218).

Zinc

Zinc is a common element in the earth's crust. It is mined and refined in Canada and has many of industrial uses. Anthropogenic sources of zinc release to the environment include burning of coal, fertilizer use and steel production (Agency for Toxic Substances and Disease Registry 2017). Zinc is an essential element, and is easily taken up by plants.

All of the deer tissue samples had detectable levels of zinc ranging from 6.22 mg/kg ww to 50.4 mg/kg ww. Zinc concentrations were notably lower in D019 and D031 than the rest of the samples (6.22 mg/kg ww and 11 mg/kg ww, respectively). The remaining concentrations were relatively similar between the samples.

Results of the Kruskal-Wallis test indicate that zinc concentrations did not differ significantly between 2016 and 2017 deer tissue samples (P=0.918).

Zirconium

Zirconium is present naturally in minerals and rocks, although the most common form is resistant to weathering so it is not often introduced into soils and therefore not often taken up by plants (Lenntech 2017). Zirconium can also be introduced into the environment due to human activities; however, natural sources are considered more abundant (Salminen et al. 2005).

Zirconium has an LDL of 0.040 mg/kg ww. Only two samples (5.6%), D031 and D030, had detectable concentration levels (0.053 mg/kg ww and 0.055 mg/kg ww, respectively).

Results of the Kruskal-Wallis test indicate that zirconium concentrations did not differ significantly between 2016 and 2017 deer tissue samples (P=0.143).

Cyanide

Cyanide is group of organic compounds that can be found naturally in the environment or introduced through anthropogenic means. Some micro-organisms (bacteria, fungi and algae) produce cyanide and it is also found naturally in some plants such as soy and released to the environment during decomposition. Cyanide can also be introduced into the environment from industrial processes and effluent, including from gold processing plants; as well as from landfills, public wastewater treatment plants, and some pesticides (Agency for Toxic Substances and Disease Registry 2017; United States Department of the Interior 2016).

Cyanide has a LDL of 0.10 mg/kg ww and in 2017 only one sample (3.3%) had a detectable concentration level of 0.11 mg/kg ww. This value is considered low as it is very close to the LDL.

Results of the Kruskal-Wallis test indicate that cyanide concentrations were significantly lower in the 2017 tissue samples compared with the 2016 baseline concentrations (P=0.000).

Comparison of Results to Distance of Harvest from the Project Boundary

The concentration of contaminants relative to the distance between the deer tissue harvest location (shown in Figure 2-1) and the boundary of the RRM are presented in Table 3-3 and Figure 3-1. These data are presented to illustrate early patterns between potential contaminant concentration levels in deer tissue and proximity to the RRM. Interestingly, the number of analytes that showed decreasing concentrations with increasing distance from the RRM was the same as the number of analytes that showed increasing concentrations with increasing distance from the RRM. However, as seen in Table 3-3 and in the various graphs in Figure 3-1, none of the contaminants exhibited a strong relationship between concentration levels and proximity to the RRM boundary. No test for significance was performed on the r_s values since all of the relationships between analyte and distance from the RRM were interpreted as very weak or weak.

Within most of the potential contaminant concentration datasets there exists a high degree of variability. The standard deviations calculated for the potential contaminants sampled in 2017 ranged from 0.00 mg/kg ww to 737 mg/kg ww. The low sample size (n=36) is a likely contributor to the high degree of variation detected in the datasets. With subsequently sampling rounds, it is anticipated that between year data can be pooled for each of the potential contaminants, resulting in a more robust dataset from which to observe statistical trends.

Table 3-1: Measured Contaminants in White-tailed Deer Samples in 2017 (n=36)

Contaminant	Mean (mg/kg ww)	Median (mg/kg ww)	Minimum (mg/kg ww)	Maximum (mg/kg ww)	SE[1] (mg/kg ww)	SD[2] (mg/kg ww)	Kurtosis[3]	Skewness[3]
Aluminum	0.5244	0.0000	0.0000	4.2200	0.1723	1.0336	5.99	2.54
Antimony	0.0004	0.0000	0.0000	0.0061	0.0002	0.0013	12.38	3.43
Arsenic	0.0021	0.0000	0.0000	0.0220	0.0009	0.0051	7.61	2.79
Barium	**0.0438**	**0.0420**	**0.0160**	**0.1050**	**0.0036**	**0.0216**	**0.33**	**0.87**
Beryllium	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	-	-
Bismuth	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	-	-
Boron	**0.1419**	**0.2150**	**0.0000**	**0.3500**	**0.0232**	**0.1392**	**-1.93**	**0.02**
Cadmium	0.4209	0.2815	0.0011	1.8900	0.0745	0.4468	3.11	1.75
Calcium	51.4417	49.5500	12.7000	76.4000	1.8199	10.9196	4.27	-0.59
Cesium	0.0207	0.0144	0.0024	0.1040	0.0035	0.0212	6.54	2.43
Chromium	**0.0745**	**0.0335**	**0.0000**	**0.3600**	**0.0170**	**0.1022**	**1.90**	**1.77**
Cobalt	**0.0498**	**0.0527**	**0.0000**	**0.0943**	**0.0041**	**0.0248**	**-0.28**	**-0.62**
Copper	**56.2337**	**58.0000**	**0.5740**	**173.0000**	**6.2652**	**37.5910**	**1.13**	**0.60**
Iron	193.0722	141.0000	49.3000	990.0000	32.1865	193.1192	11.79	3.41
Lead	0.0126	0.0055	0.0000	0.1310	0.0040	0.0241	17.28	3.87
Lithium	0.1378	0.0550	0.0000	0.7200	0.0318	0.1906	2.14	1.63
Magnesium	168.6750	171.5000	47.3000	325.0000	6.3584	38.1505	10.06	0.99
Manganese	**2.4550**	**2.6300**	**0.0660**	**4.3500**	**0.2064**	**1.2386**	**-0.75**	**-0.51**
Mercury	0.0033	0.0028	0.0000	0.0114	0.0005	0.0027	2.50	1.54
Molybdenum	**0.3881**	**0.3700**	**0.0104**	**0.8660**	**0.0469**	**0.2813**	**-1.38**	**0.26**
Nickel	0.0084	0.0000	0.0000	0.0760	0.0036	0.0217	4.28	2.38
Phosphorus	3451.4167	3645.0000	671.0000	4530.0000	122.8836	737.3014	5.52	-2.06
Potassium	**2937.2222**	**2920.0000**	**2150.0000**	**4190.0000**	**73.0966**	**438.5796**	**0.68**	**0.56**
Rubidium	14.1756	13.4000	6.5900	37.5000	1.0803	6.4821	3.65	1.61
Selenium	0.5452	0.4410	0.1350	1.8500	0.0555	0.3331	5.62	2.00
Sodium	**900.4167**	**867.0000**	**352.0000**	**1510.0000**	**38.3644**	**230.1863**	**0.79**	**0.18**
Strontium	0.0518	0.0380	0.0110	0.3170	0.0089	0.0532	18.54	4.02
Tellurium	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	-	-
Thallium	0.0003	0.0000	0.0000	0.0017	0.0001	0.0004	3.76	1.61
Tin	0.0104	0.0000	0.0000	0.0750	0.0032	0.0190	2.91	1.84
Uranium	0.0002	0.0000	0.0000	0.0046	0.0001	0.0009	20.11	4.35
Vanadium	0.0307	0.0000	0.0000	0.2360	0.0093	0.0556	6.42	2.49
Zinc	**31.5728**	**31.3500**	**6.2200**	**50.4000**	**1.7505**	**10.5032**	**0.01**	**-0.15**

Zirconium	0.0030	0.0000	0.0000	0.0550	0.0021	0.0125	15.29	4.05
Cyanide	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	-	-

Notes:

[1]SE – Standard Error

[2]SD – Standard Deviation

[3]The values for asymmetry and kurtosis between -2 and +2 are considered acceptable in order to prove normal univariate distribution (George & Mallery, 2010).

Table 3-2: Comparison between 2016 and 2017 Contaminant Concentrations

Contaminant	2016 Mean (mg/kg ww)	2017 Mean (mg/kg ww)	K-W[1] Statistic	P-Value[2]
Aluminum	0.9784	0.5244	0.58	0.447
Antimony	0.0104	0.0004	3.17	0.075
Arsenic	**0.0118**	**0.0021**	**30.85**	**0.000**
Barium	0.0444	0.0438	0.57	0.452
Beryllium	0.0000	0.0000	0.00	1.000
Bismuth	**0.0010**	**0.0000**	**10.73**	**0.001**
Boron	0.1918	0.1419	1.37	0.242
Cadmium	0.5391	0.4209	2.92	0.087
Calcium	50.6026	51.4417	2.15	0.143
Cesium	**0.0479**	**0.0207**	**6.79**	**0.009**
Chromium	0.1391	0.0745	1.00	0.317
Cobalt	0.0505	0.0498	0.28	0.600
Copper	**80.8266**	**56.2337**	**6.32**	**0.012**
Iron	160.3842	193.0722	0.14	0.709
Lead	1.1385	0.0126	2.00	0.157
Lithium	**0.2516**	**0.1378**	**8.79**	**0.003**
Magnesium	161.2000	168.6750	1.89	0.169
Manganese	2.2904	2.4550	0.81	0.369
Mercury	**0.0085**	**0.0033**	**13.89**	**0.000**
Molybdenum	0.3488	0.3881	0.35	0.556
Nickel	**0.0710**	**0.0084**	**4.22**	**0.040**
Phosphorus	3488.7632	3451.4167	0.10	0.754
Potassium	2737.1053	2937.2222	3.54	0.060
Rubidium	**17.9661**	**14.1756**	**5.74**	**0.017**
Selenium	**0.8755**	**0.5452**	**12.13**	**0.000**
Sodium	814.3421	900.4167	3.90	0.048

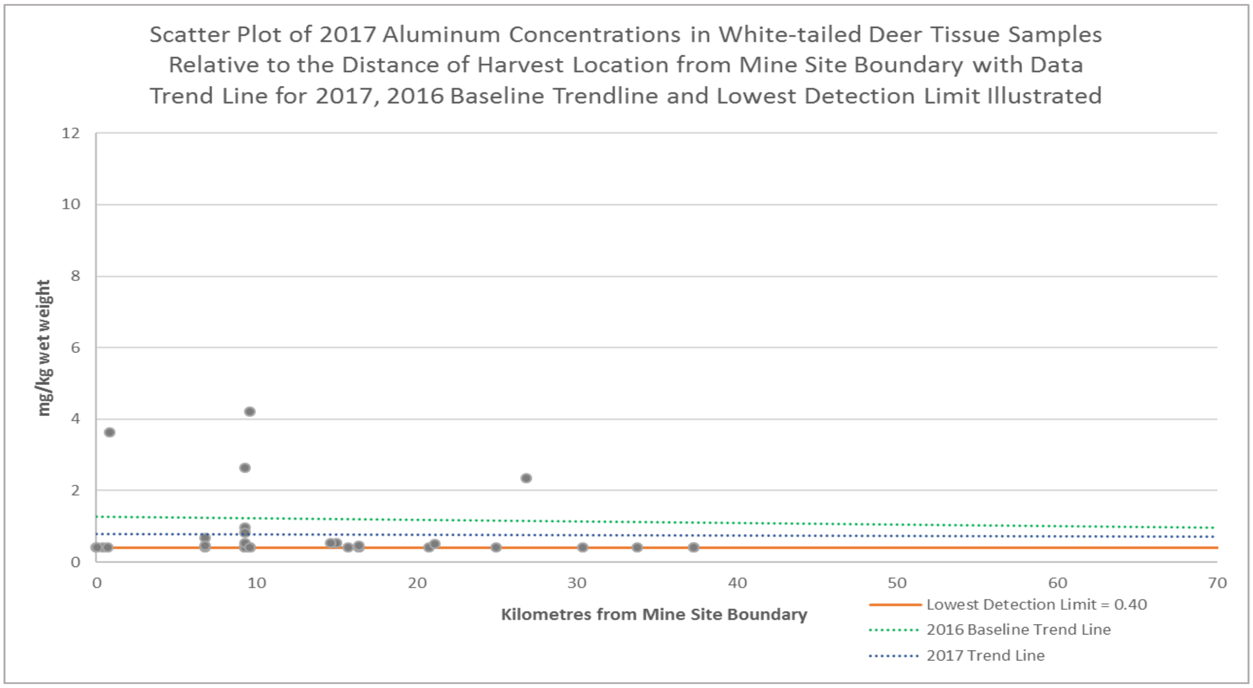
Table 3-2: Comparison between 2016 and 2017 Contaminant Concentrations (continued)

Contaminant	2016 Mean (mg/kg ww)	2017 Mean (mg/kg ww)	K-W[1] Statistic	P-Value[2]
Strontium	**0.0328**	**0.0518**	**6.25**	**0.012**
Tellurium	0.0000	0.0000	0.00	1.000
Thallium	0.0005	0.0003	2.46	0.117
Tin	**0.0241**	**0.0104**	**8.02**	**0.005**
Uranium	0.0000	0.0002	0.97	0.326
Vanadium	0.0345	0.0307	1.52	0.218
Zinc	32.1711	31.5728	0.01	0.918
Zirconium	0.0000	0.0030	2.14	0.143
Cyanide	**0.1779**	**0.0000**	**41.30**	**0.000**

Notes:
[1]K-W is the Kruskall-Wallis statististic, calculated, where the degrees of freedom is 1.
[2] Significance was assigned at $P<0.05$.
Bold values indicate significant differences between the 2016 and 2017 contaminant concentrations

Table 3-3: Relationship between Contaminant Concentration and Distance from Rainy River Mine for Samples Collected in 2017

Contaminant	Spearman Rho (r_S)
Aluminum	-0.039
Antimony	0.352
Arsenic	0.192
Barium	0.276
Berylium	-
Bismuth	-
Boron	0.134
Cadmium	-0.077
Calcium	-0.353
Cesium	0.26
Chromite	-0.218
Cobalt	-0.014
Copper	-0.092
Iron	-0.135
Lead	0.358
Lithium	0.034
Magnesium	0.132
Manganese	0.039
Mercury	-0.106
Molybdenum	-0.129
Nickel	-0.081
Phosphorus	-0.015
Potassium	0.022
Rubidium	0.017
Selenium	-0.189
Sodium	-0.105
Strontium	0.134
Tellurium	-
Thallium	-0.043
Tin	-0.137
Uranium	0.002
Vanadium	-0.047
Zinc	-0.054
Zirconium	0.076
Cyanide	-



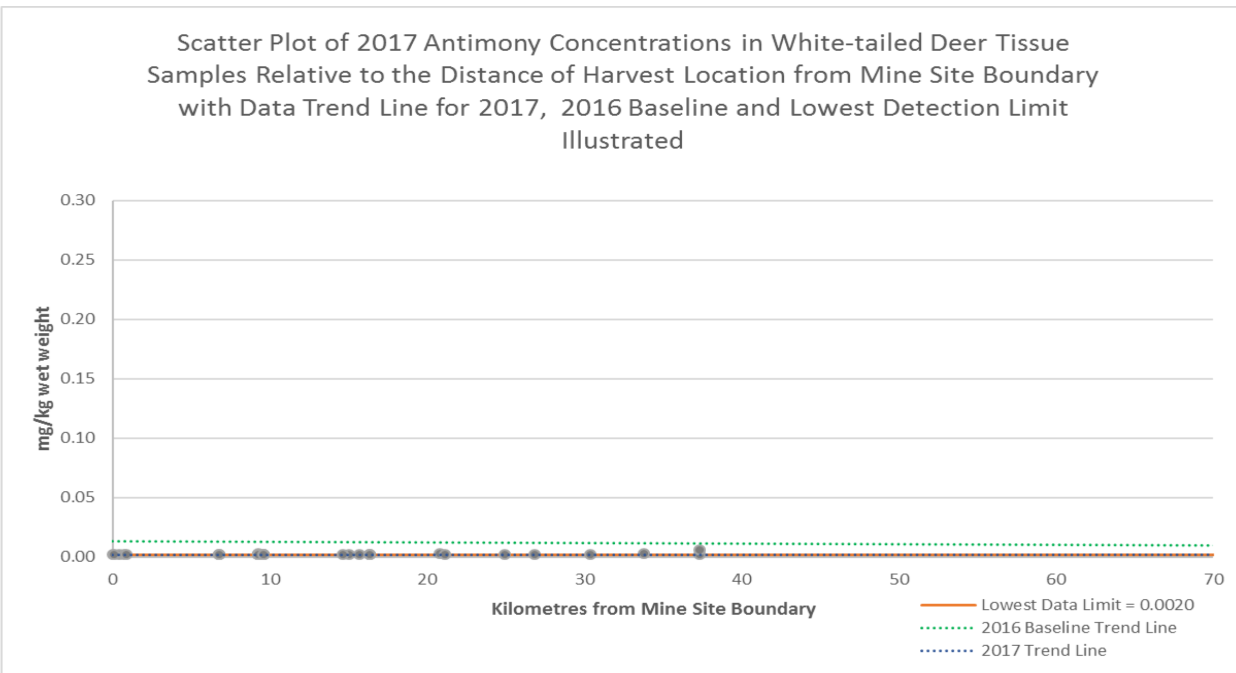
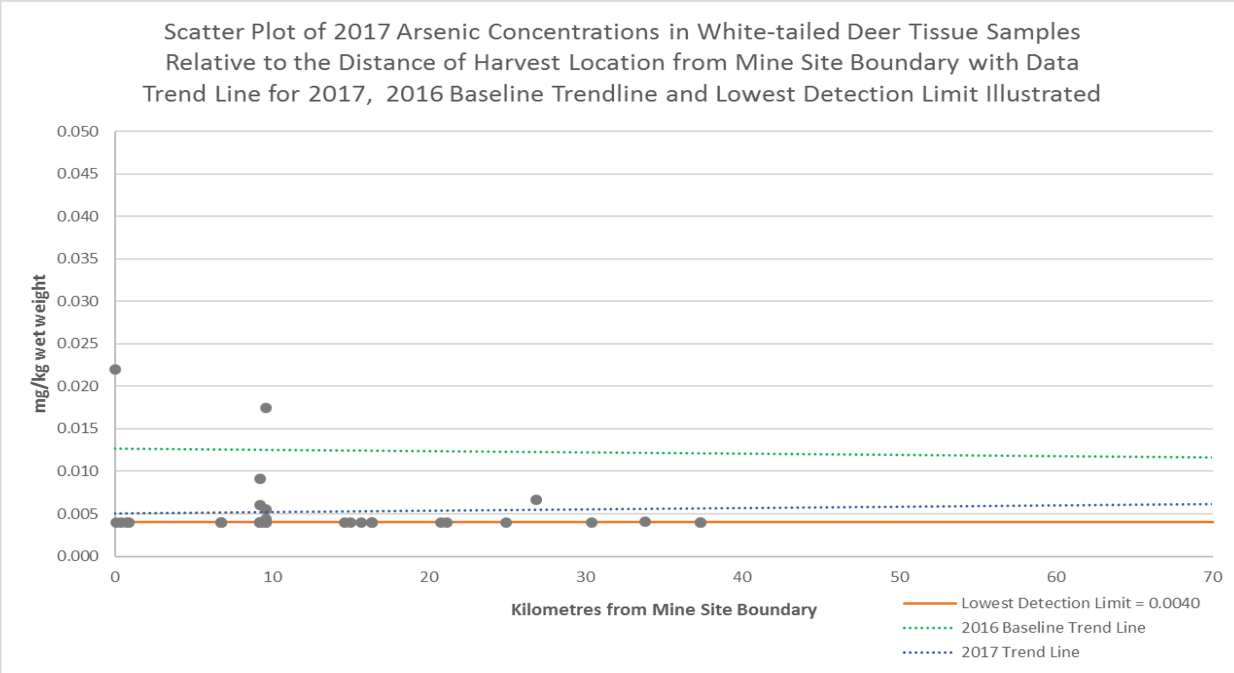


Figure 3-1: Scatter Plots showing 2017 Contaminant Concentrations for White-tailed Deer Tissue Samples relative to the distance of the Harvest Location from the Mine Site Boundary with a Linear Trend Line, 2016 Baseline Trend Line and the Lowest Detection Limit



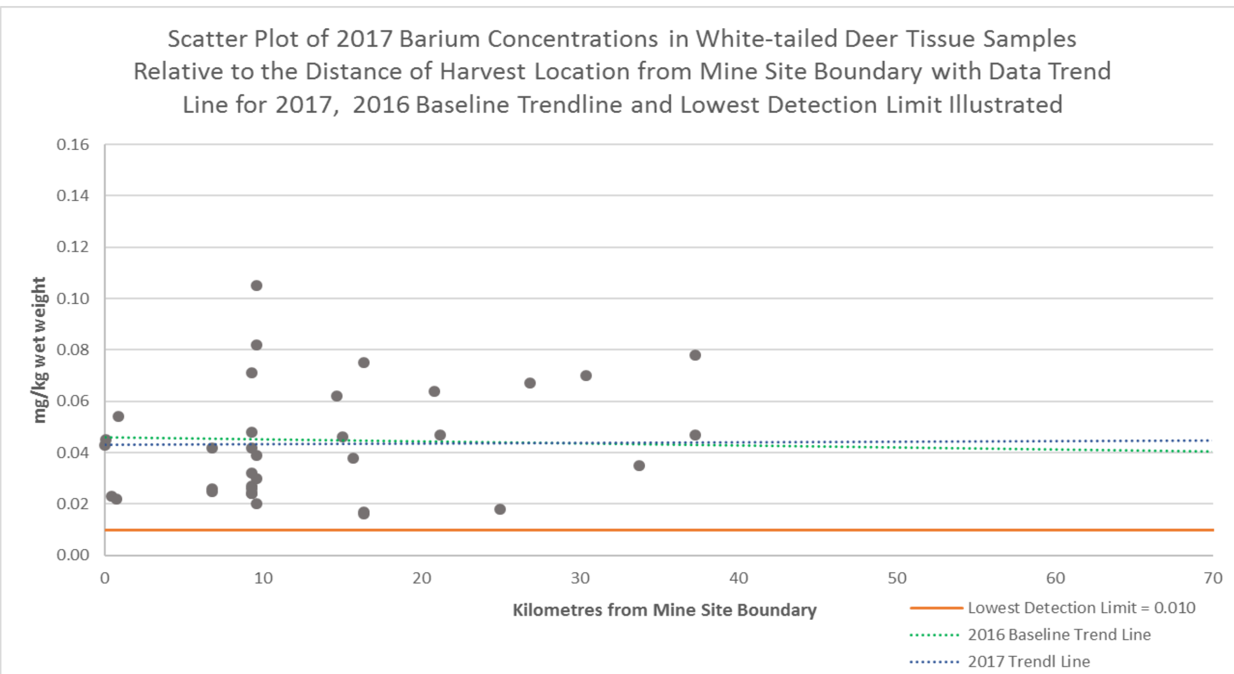
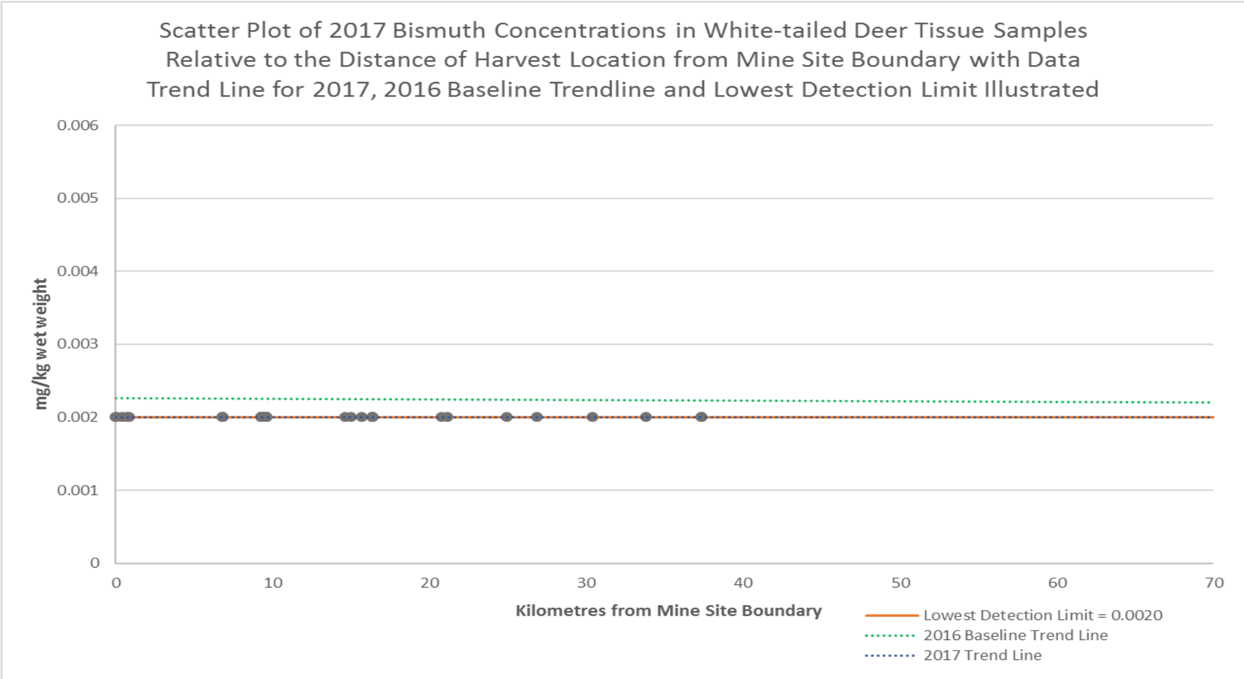


Figure 3-1 (cont'd): Scatter Plots showing 2017 Contaminant Concentrations for White-tailed Deer Tissue Samples relative to the distance of the Harvest Location from the Mine Site Boundary with a Linear Trend Line, 2016 Baseline Trend Line and the Lowest Detection Limit



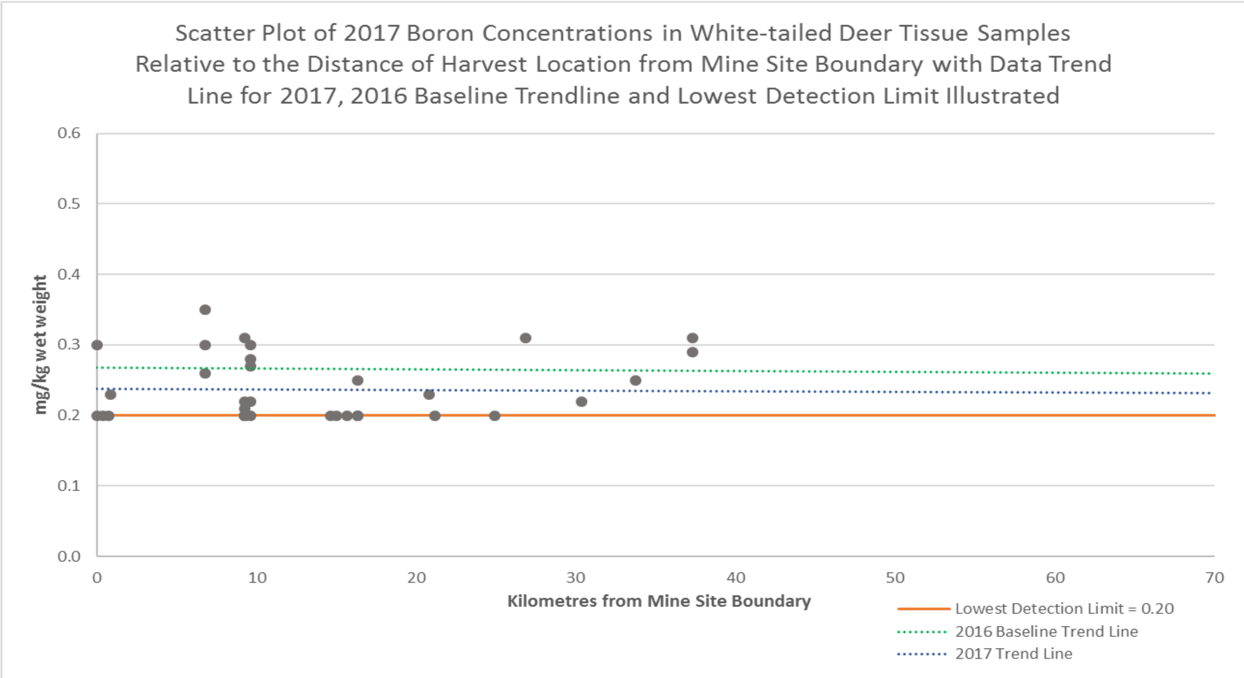
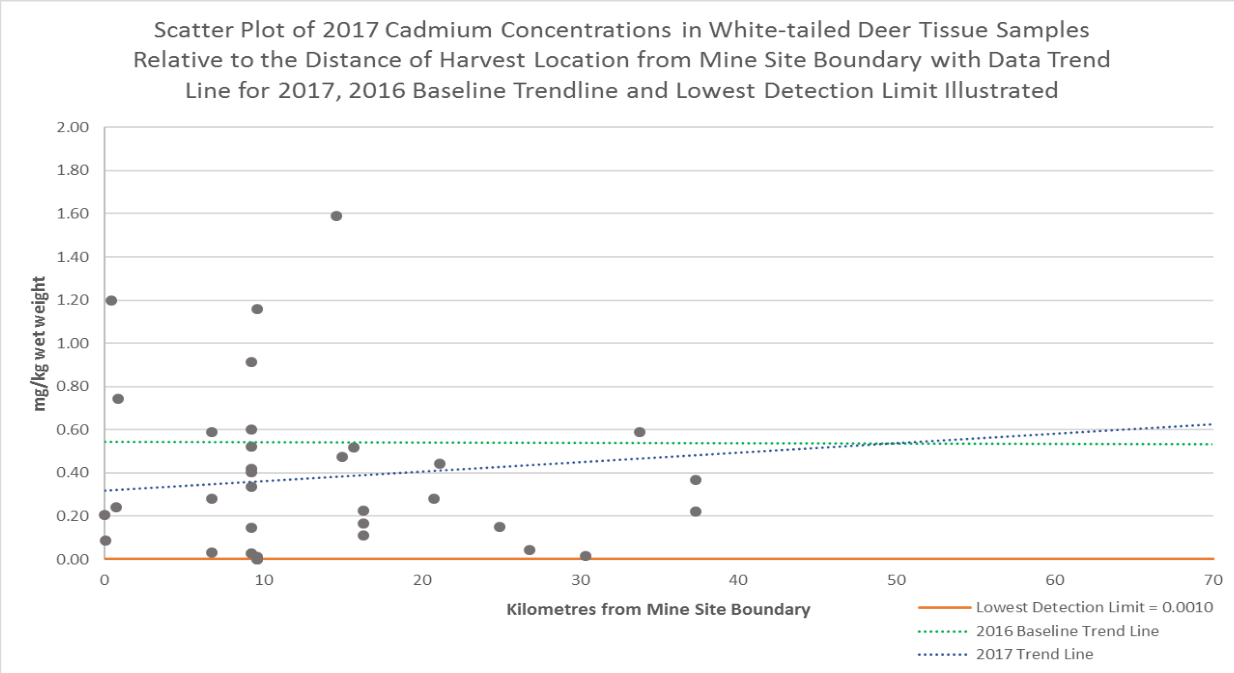


Figure 3-1 (cont'd): Scatter Plots showing 2017 Contaminant Concentrations for White-tailed Deer Tissue Samples relative to the distance of the Harvest Location from the Mine Site Boundary with a Linear Trend Line, 2016 Baseline Trend Line and the Lowest Detection Limit



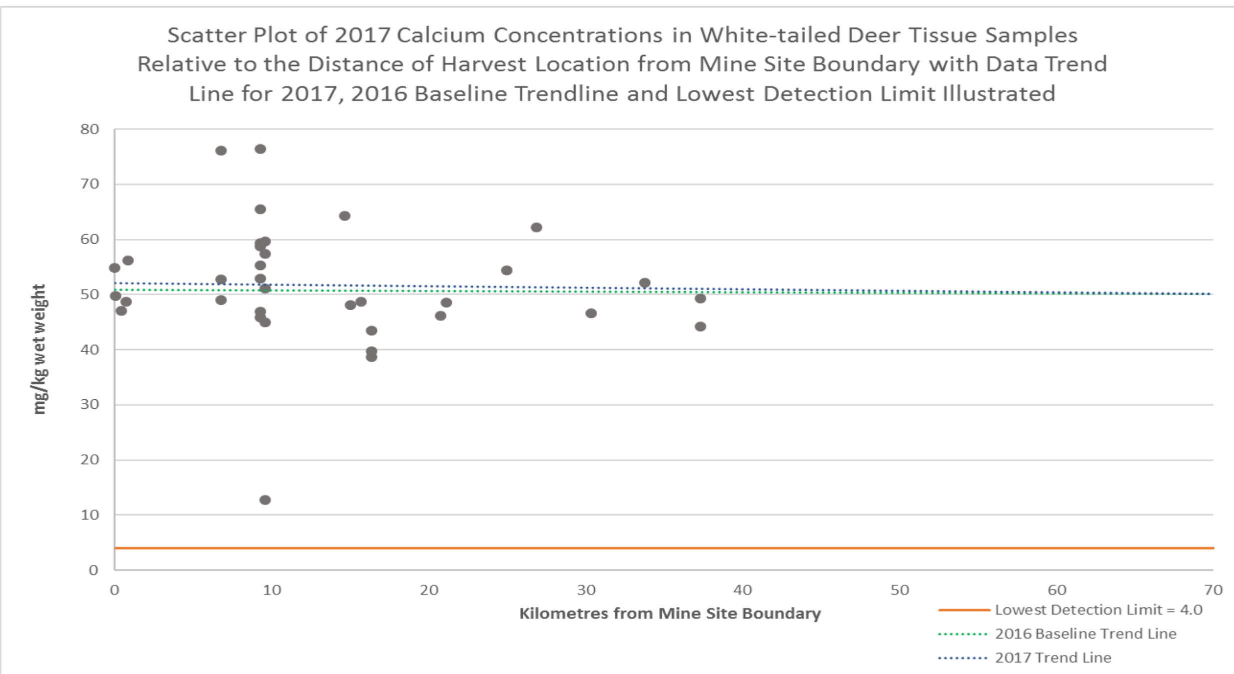
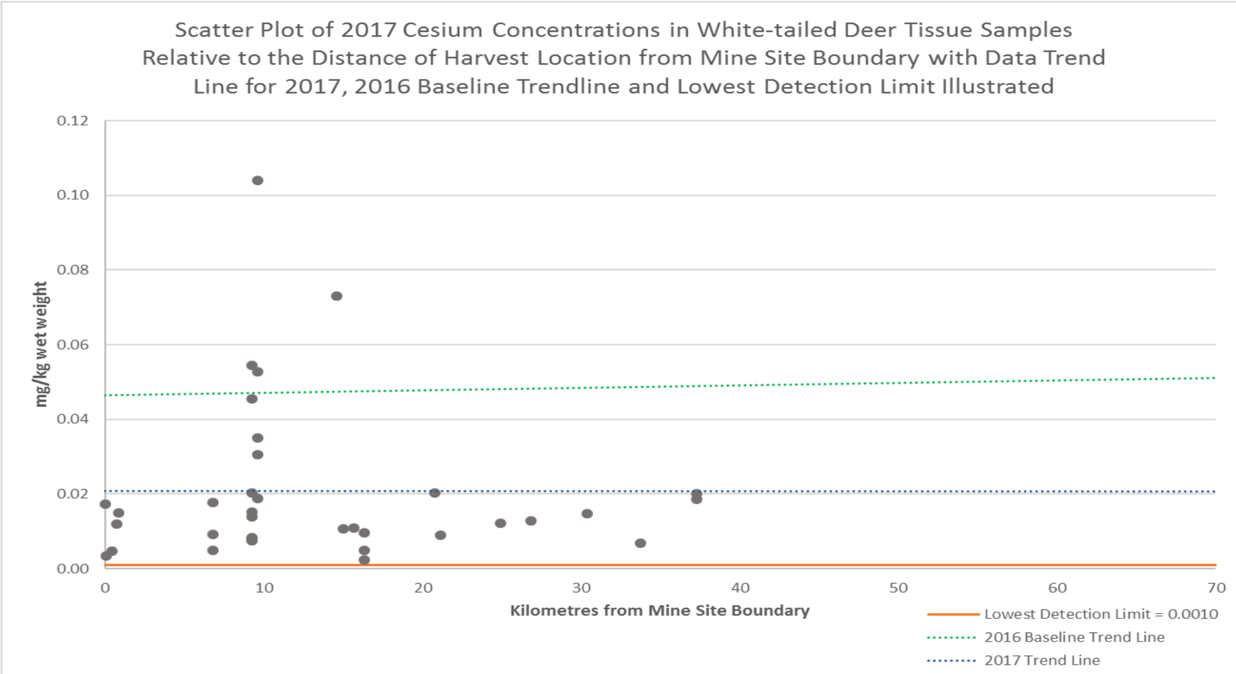


Figure 3-1 (cont'd): Scatter Plots showing 2017 Contaminant Concentrations for White-tailed Deer Tissue Samples relative to the distance of the Harvest Location from the Mine Site Boundary with a Linear Trend Line, 2016 Baseline Trend Line and the Lowest Detection Limit



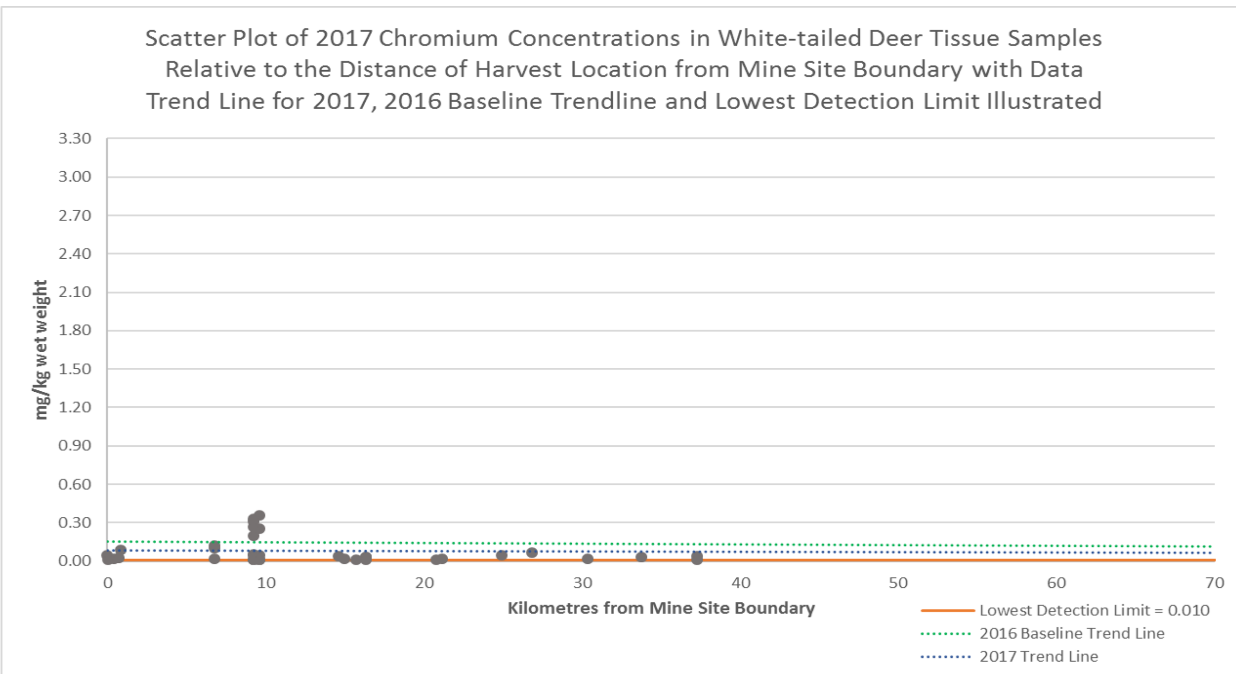
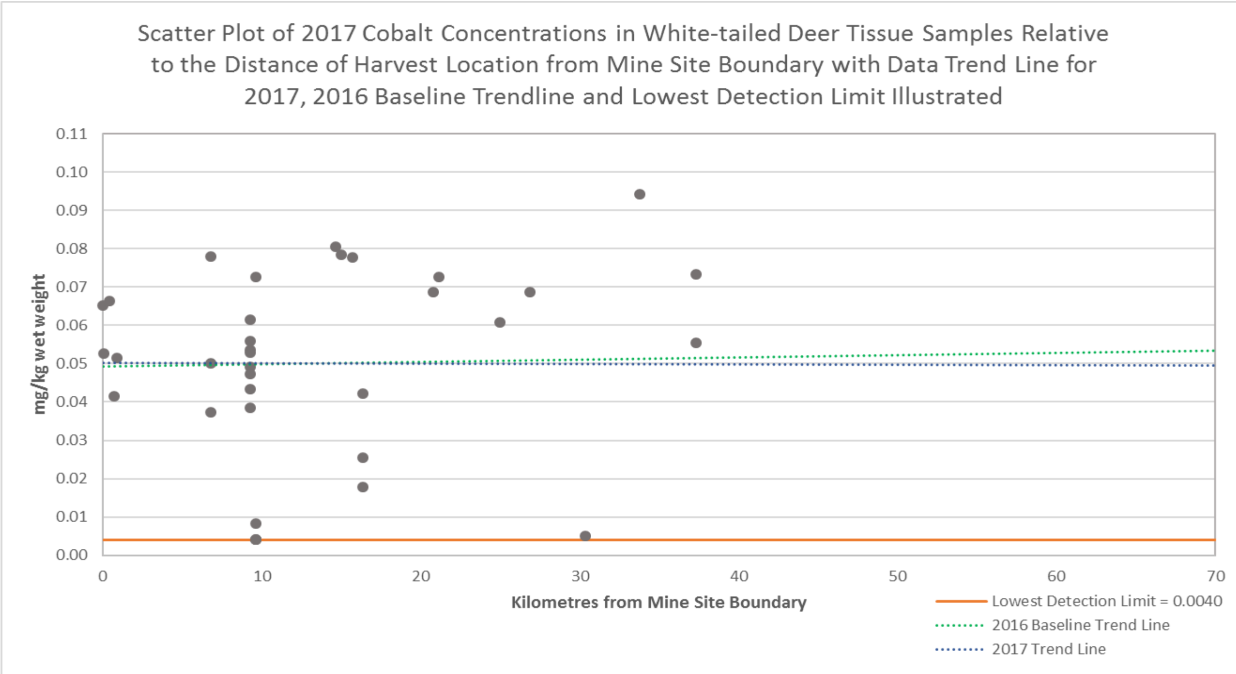


Figure 3-1 (cont'd): Scatter Plots showing 2017 Contaminant Concentrations for White-tailed Deer Tissue Samples relative to the distance of the Harvest Location from the Mine Site Boundary with a Linear Trend Line, 2016 Baseline Trend Line and the Lowest Detection Limit



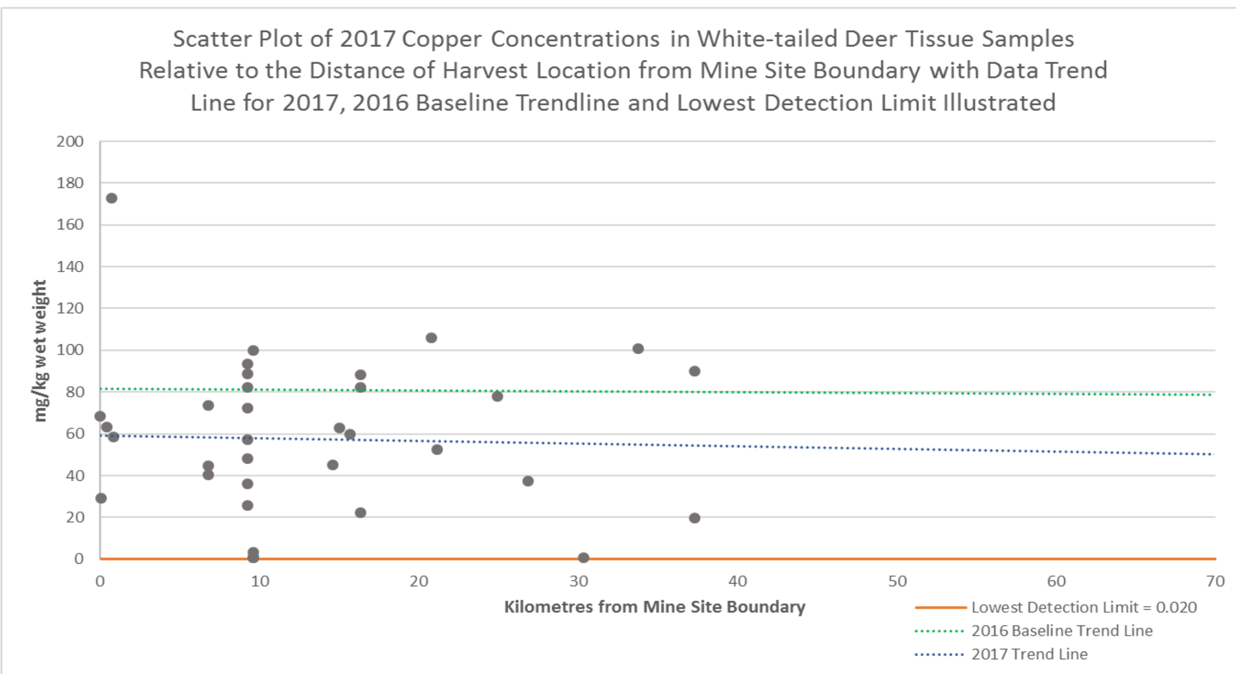
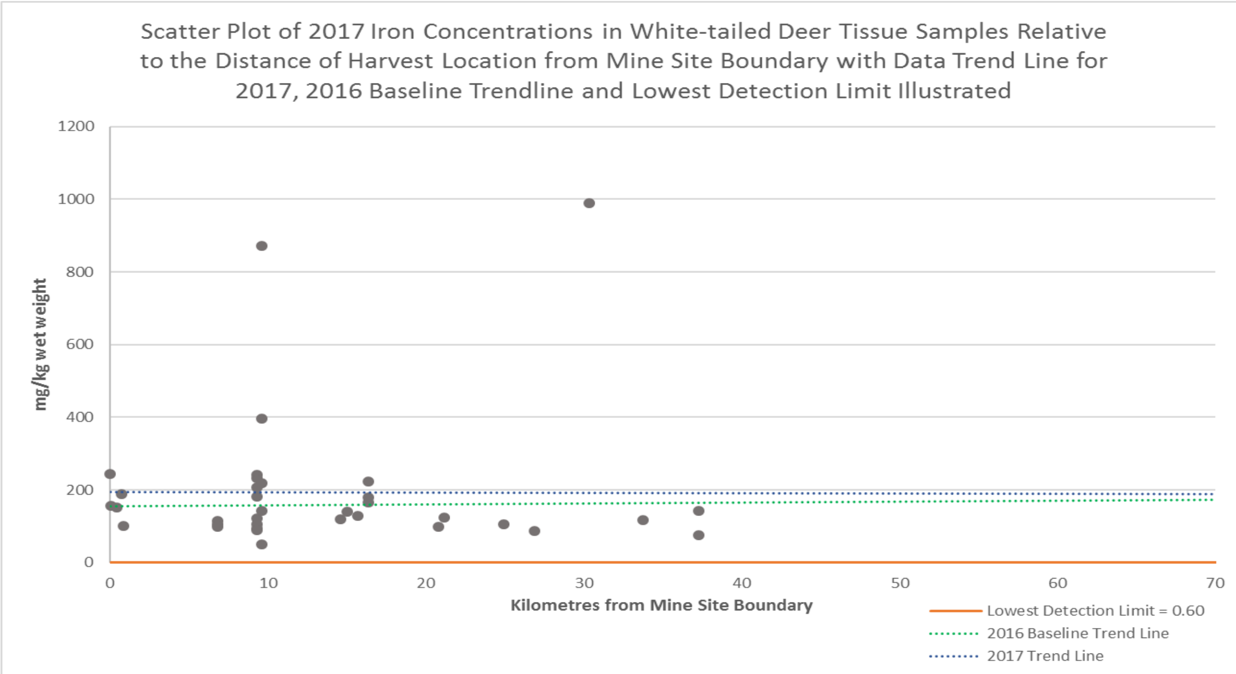


Figure 3-1 (cont'd): Scatter Plots showing 2017 Contaminant Concentrations for White-tailed Deer Tissue Samples relative to the distance of the Harvest Location from the Mine Site Boundary with a Linear Trend Line, 2016 Baseline Trend Line and the Lowest Detection Limit



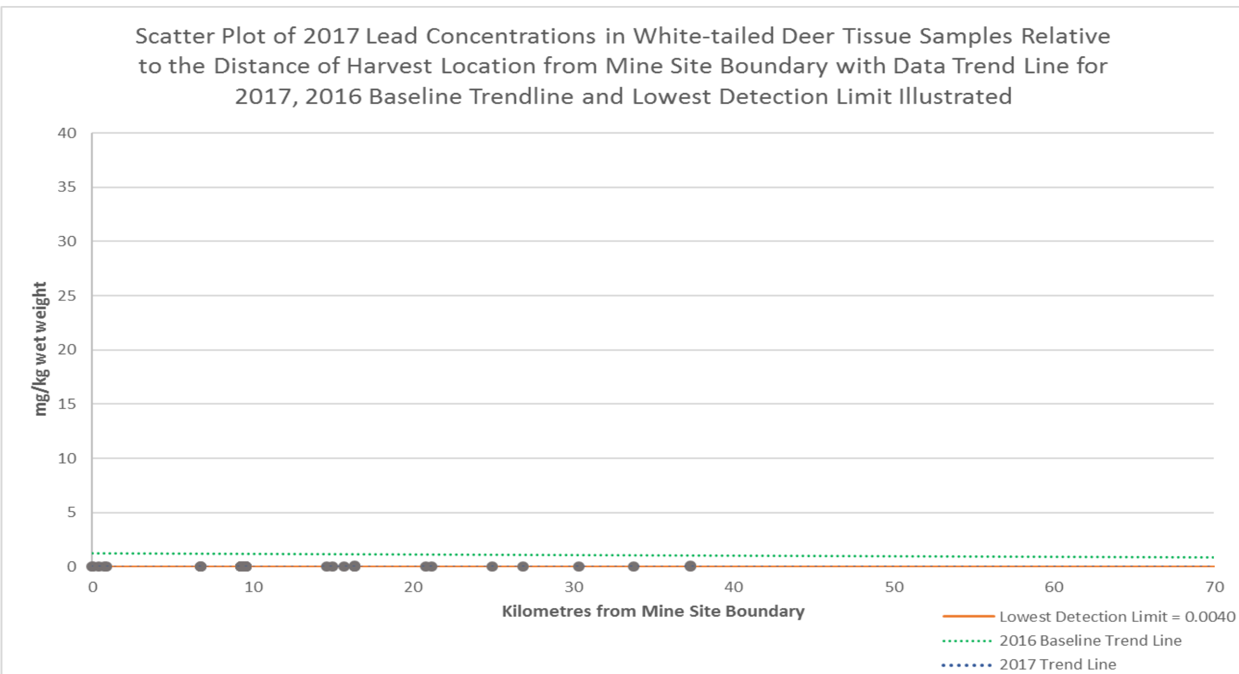
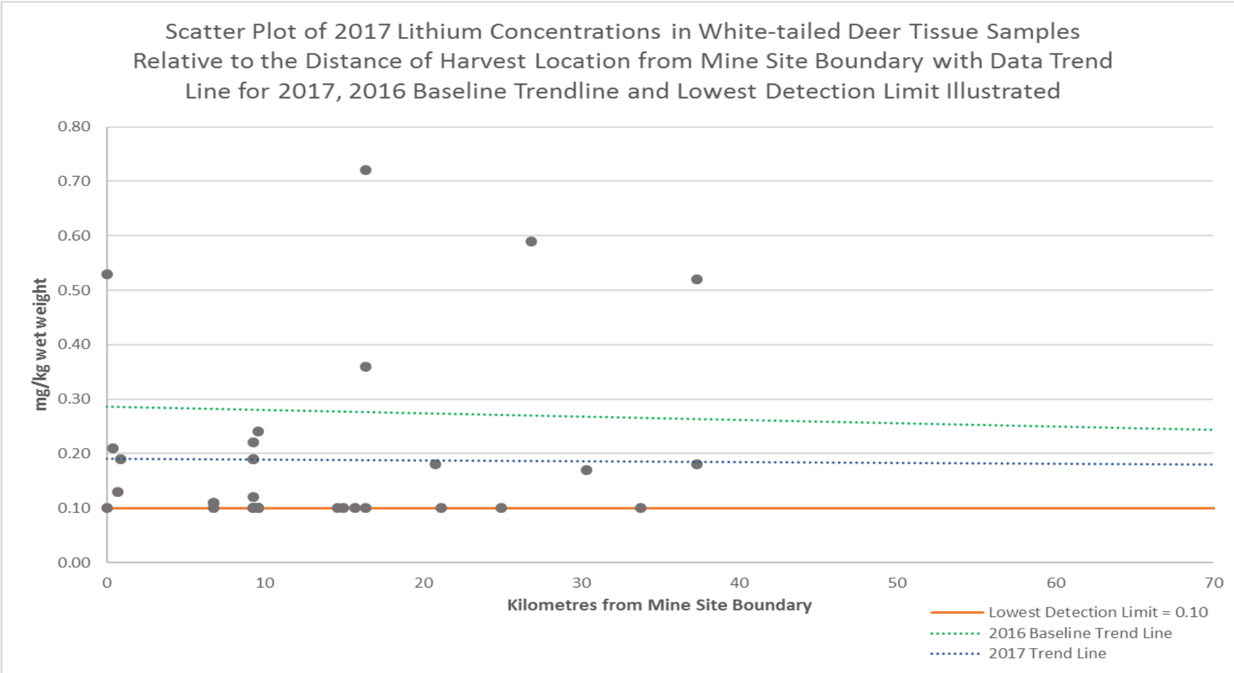


Figure 3-1 (cont'd): Scatter Plots showing 2017 Contaminant Concentrations for White-tailed Deer Tissue Samples relative to the distance of the Harvest Location from the Mine Site Boundary with a Linear Trend Line, 2016 Baseline Trend Line and the Lowest Detection Limit



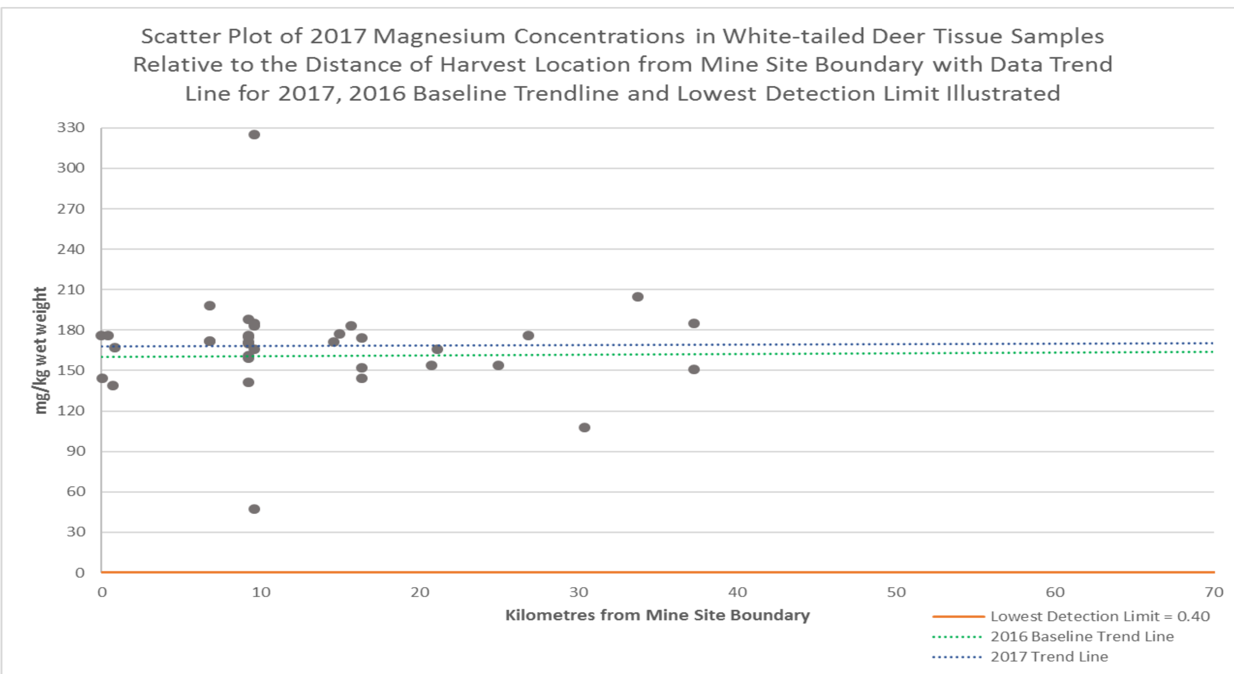
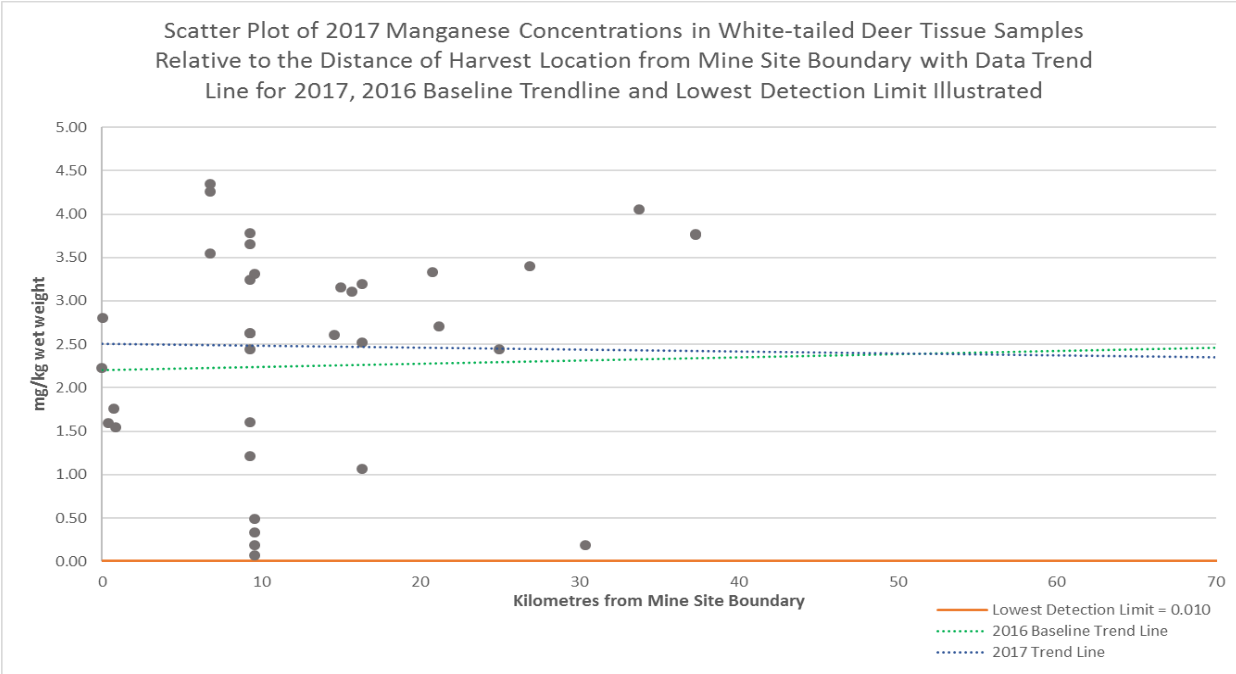


Figure 3-1 (cont'd): Scatter Plots showing 2017 Contaminant Concentrations for White-tailed Deer Tissue Samples relative to the distance of the Harvest Location from the Mine Site Boundary with a Linear Trend Line, 2016 Baseline Trend Line and the Lowest Detection Limit



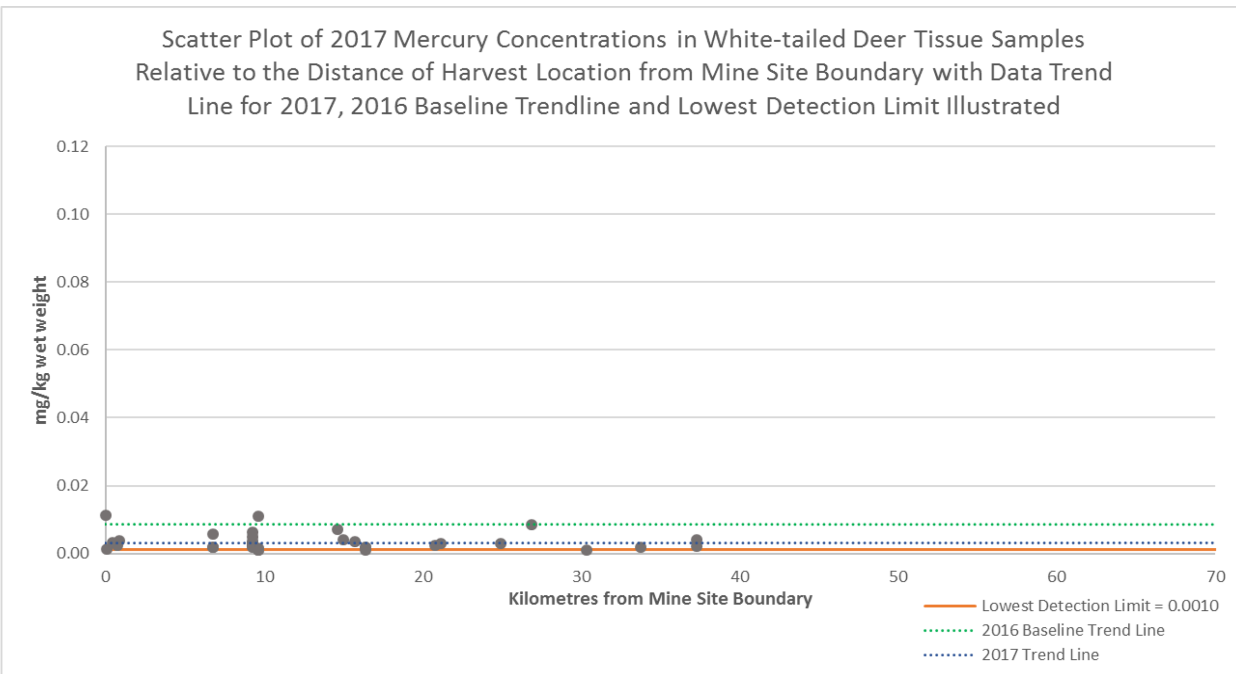
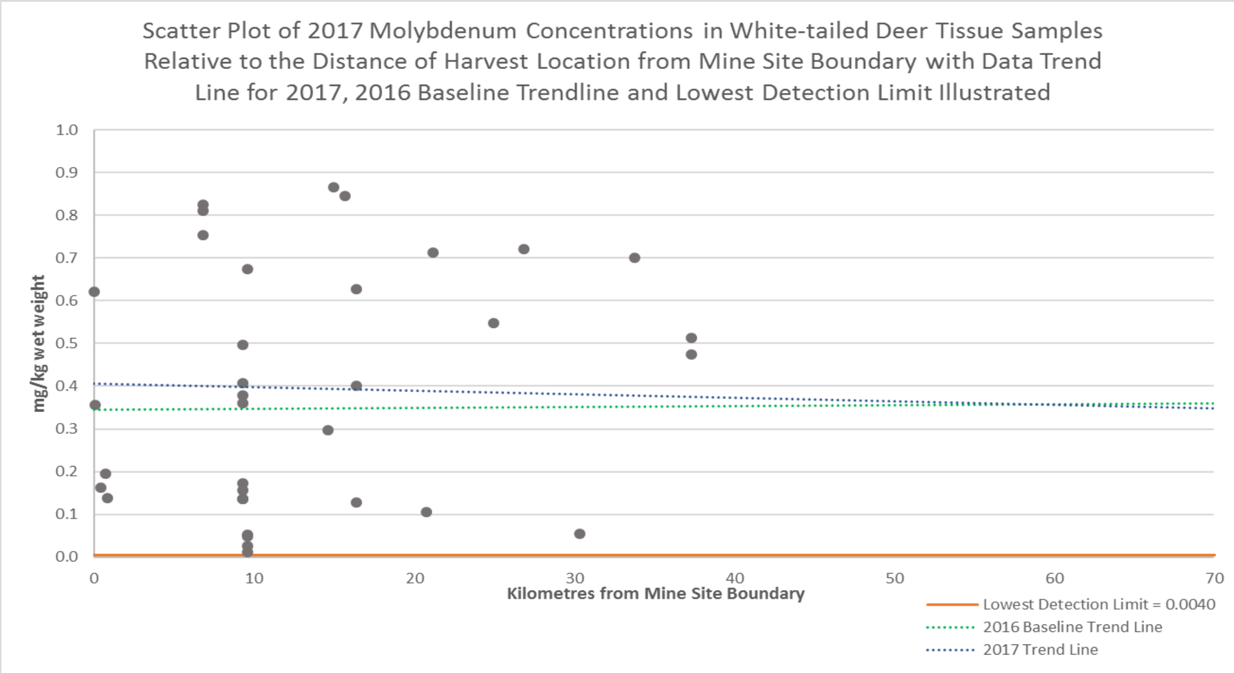


Figure 3-1 (cont'd): Scatter Plots showing 2017 Contaminant Concentrations for White-tailed Deer Tissue Samples relative to the distance of the Harvest Location from the Mine Site Boundary with a Linear Trend Line, 2016 Baseline Trend Line and the Lowest Detection Limit



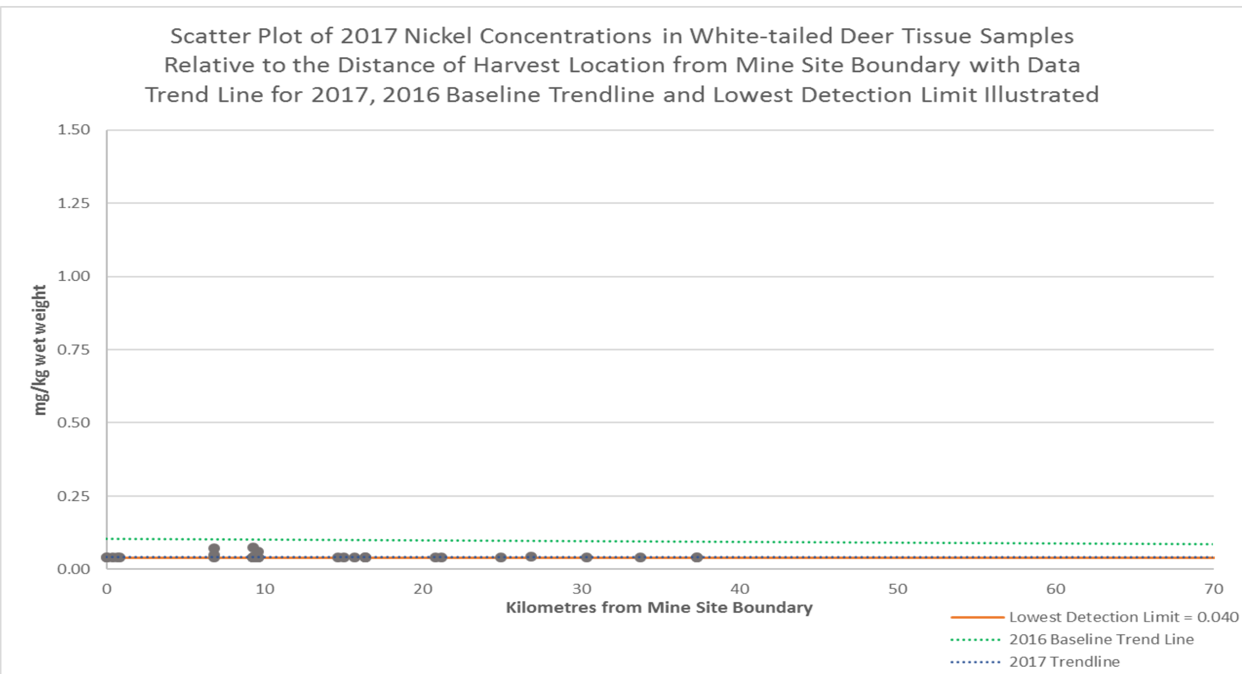
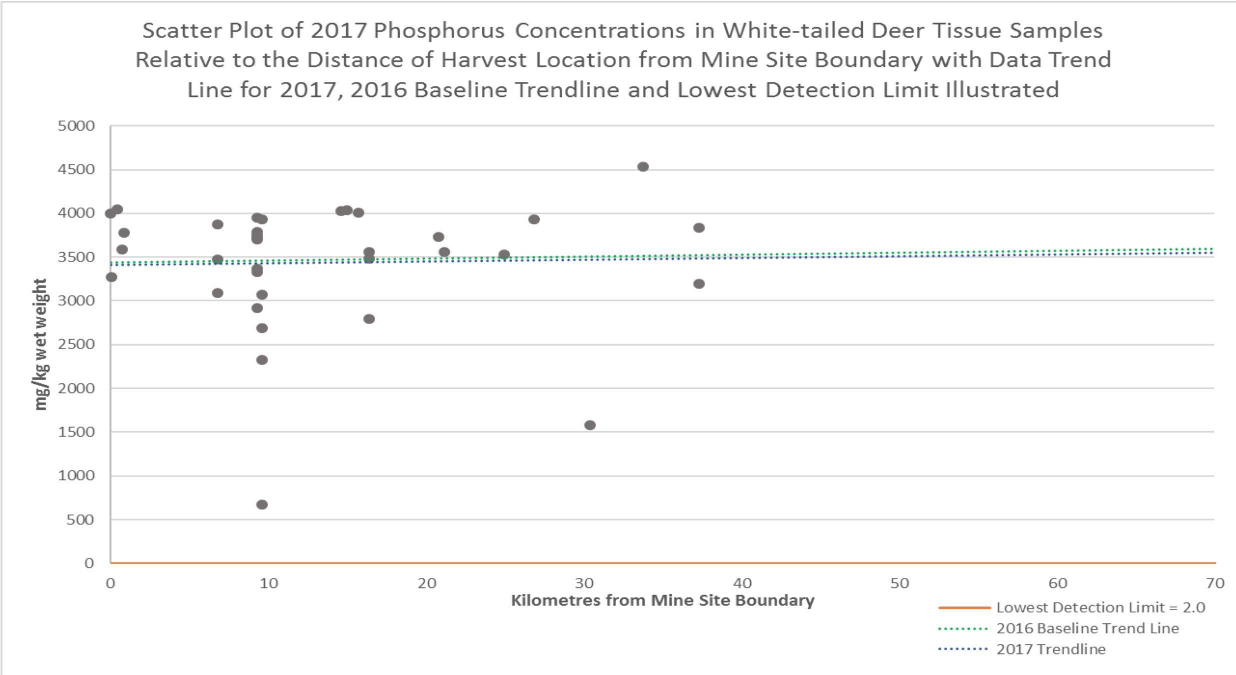


Figure 3-1 (cont'd): Scatter Plots showing 2017 Contaminant Concentrations for White-tailed Deer Tissue Samples relative to the distance of the Harvest Location from the Mine Site Boundary with a Linear Trend Line, 2016 Baseline Trend Line and the Lowest Detection Limit



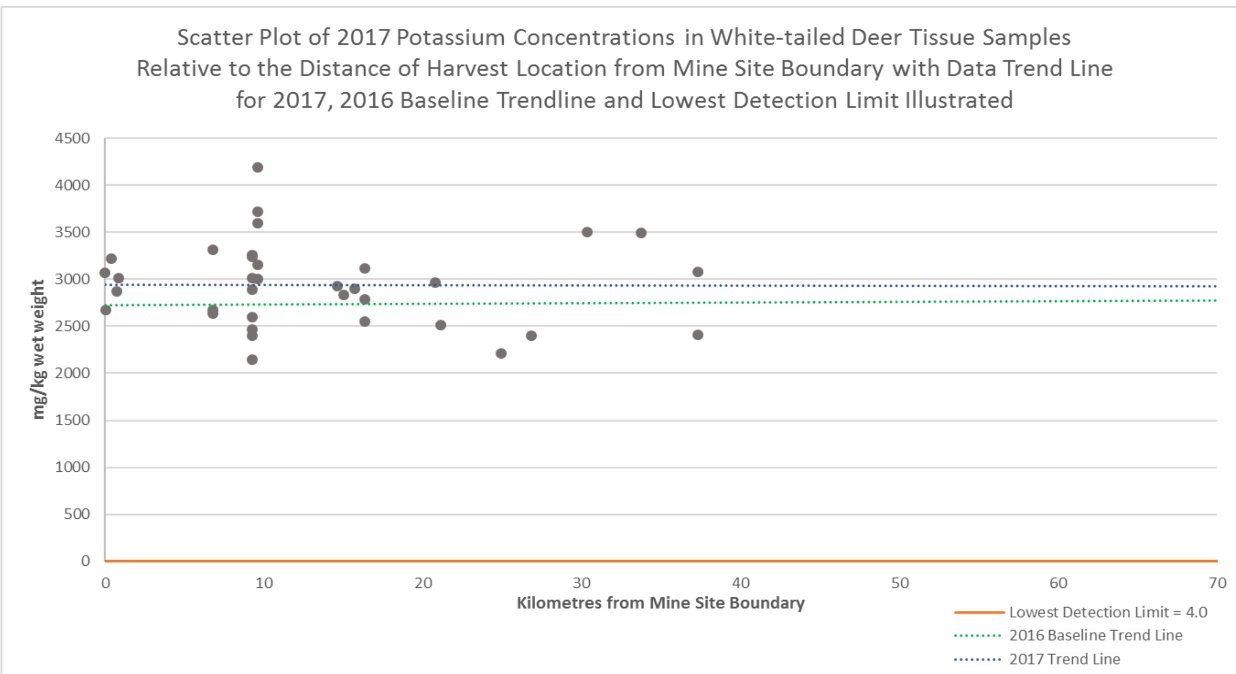
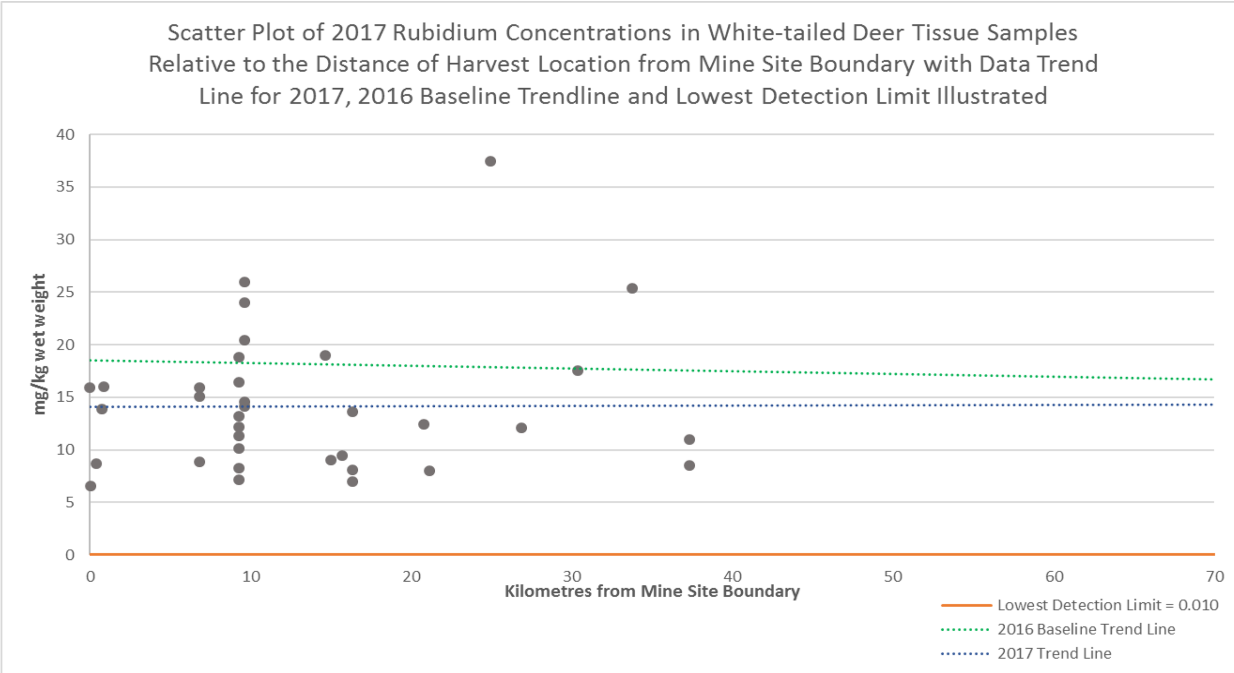


Figure 3-1 (cont'd): Scatter Plots showing 2017 Contaminant Concentrations for White-tailed Deer Tissue Samples relative to the distance of the Harvest Location from the Mine Site Boundary with a Linear Trend Line, 2016 Baseline Trend Line and the Lowest Detection Limit



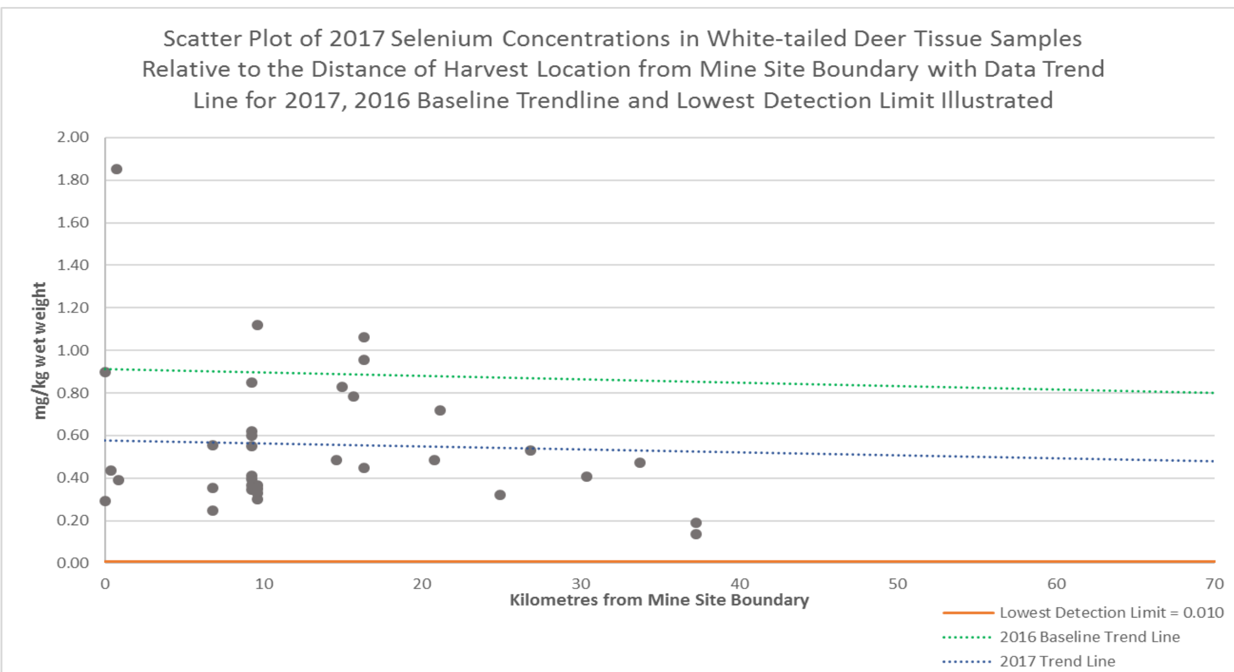
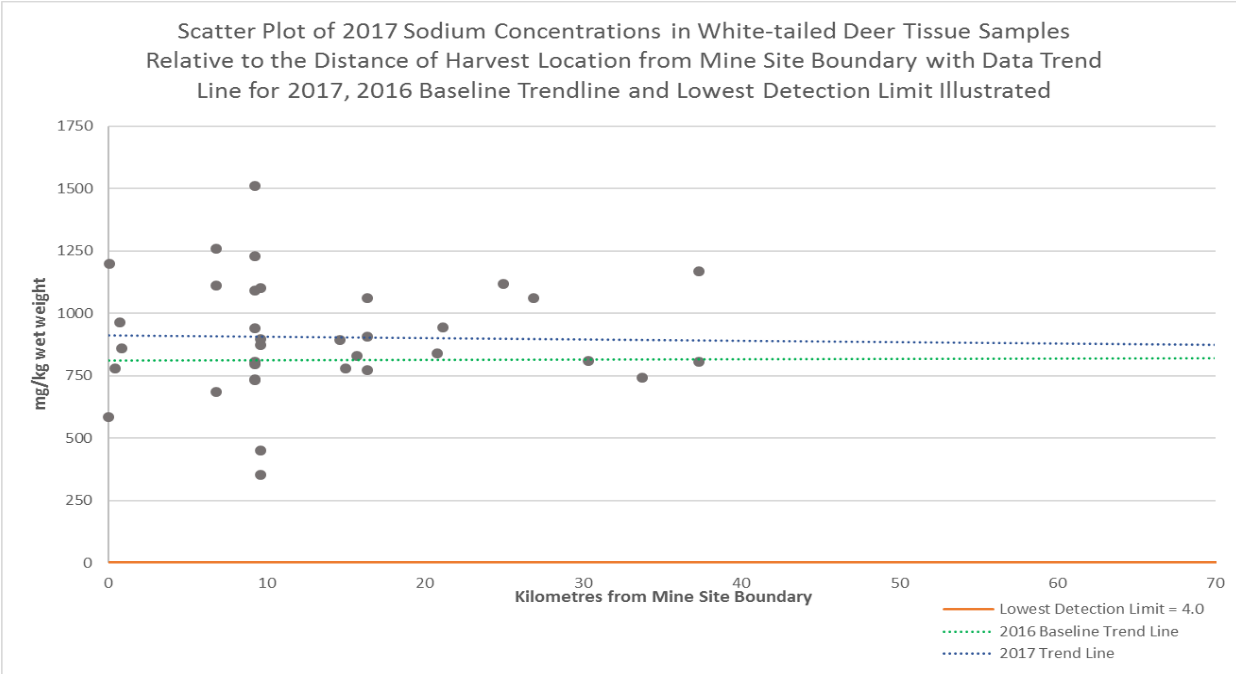


Figure 3-1 (cont'd): Scatter Plots showing 2017 Contaminant Concentrations for White-tailed Deer Tissue Samples relative to the distance of the Harvest Location from the Mine Site Boundary with a Linear Trend Line, 2016 Baseline Trend Line and the Lowest Detection Limit



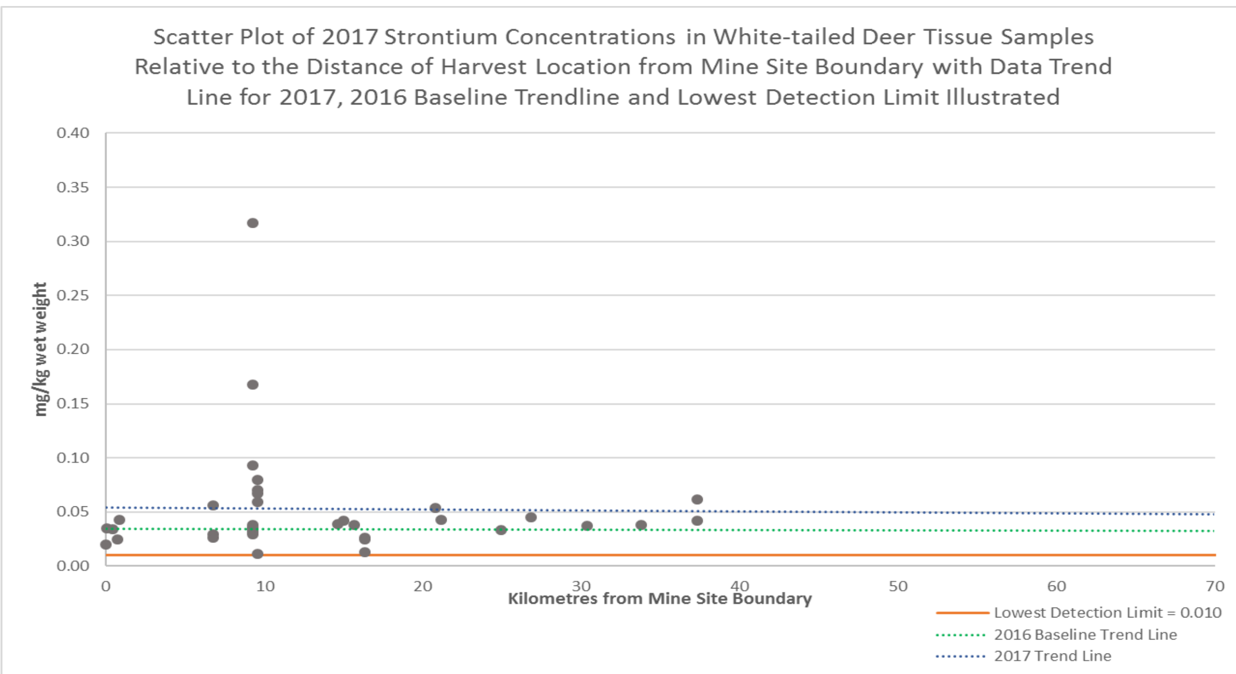
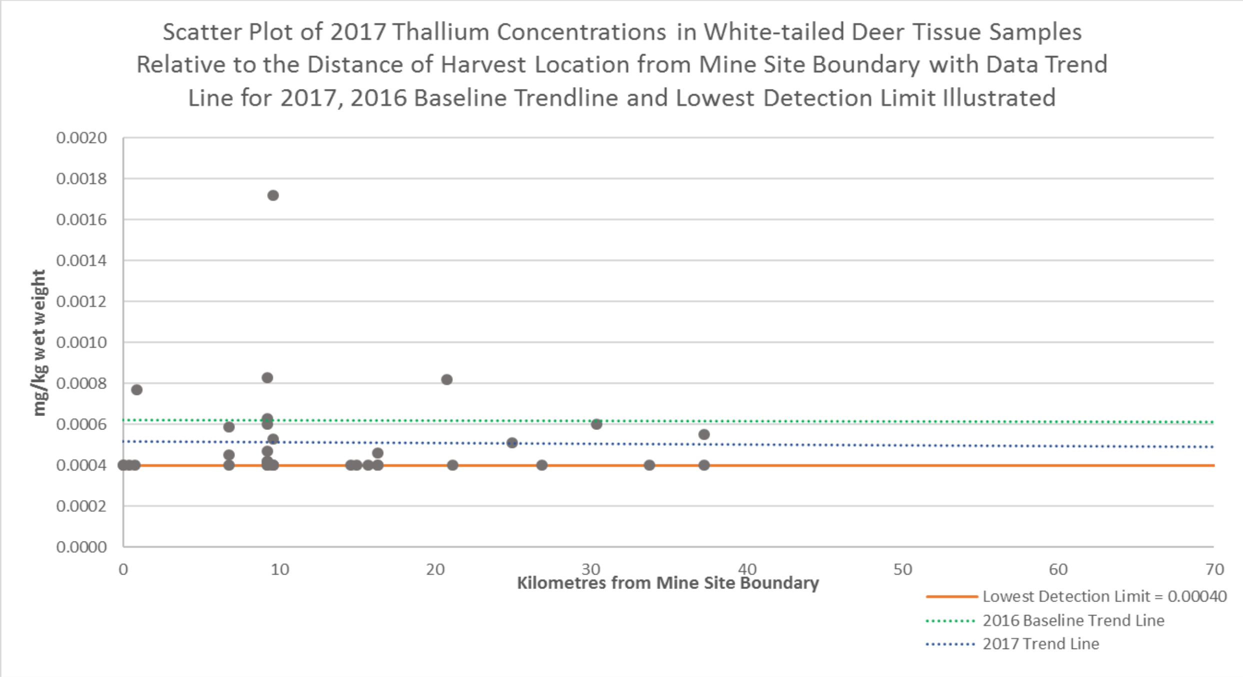
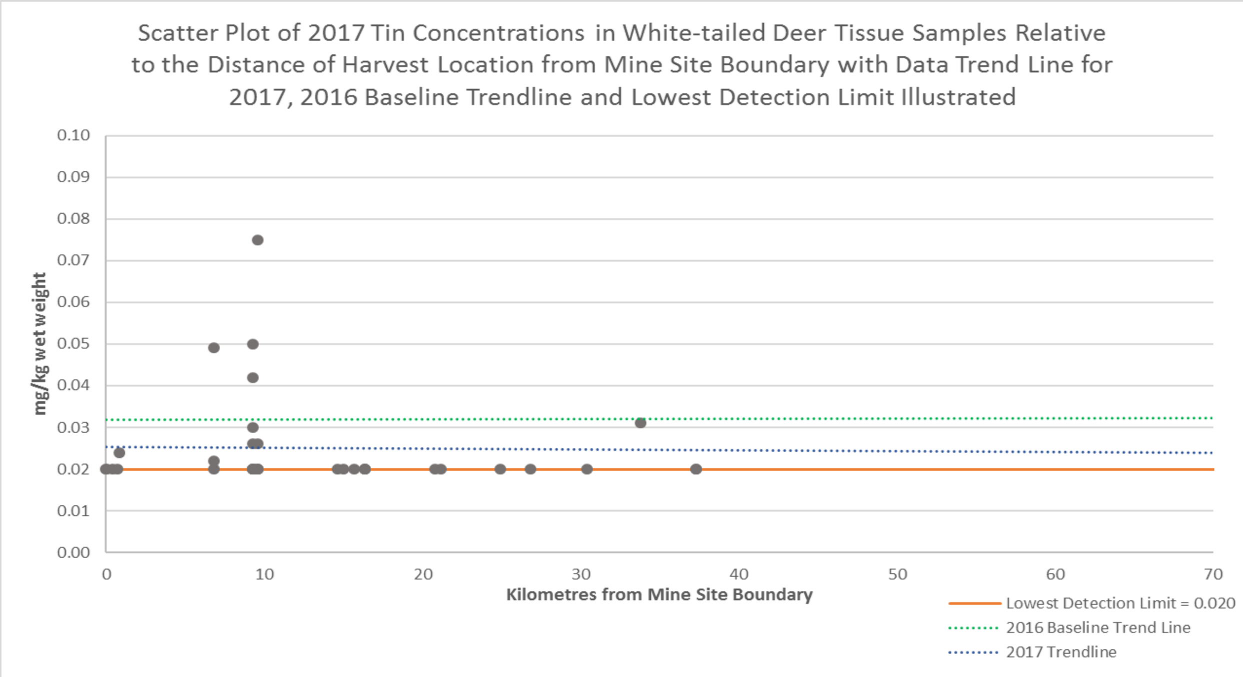


Figure 3-1 (cont'd): Scatter Plots showing 2017 Contaminant Concentrations for White-tailed Deer Tissue Samples relative to the distance of the Harvest Location from the Mine Site Boundary with a Linear Trend Line, 2016 Baseline Trend Line and the Lowest Detection Limit





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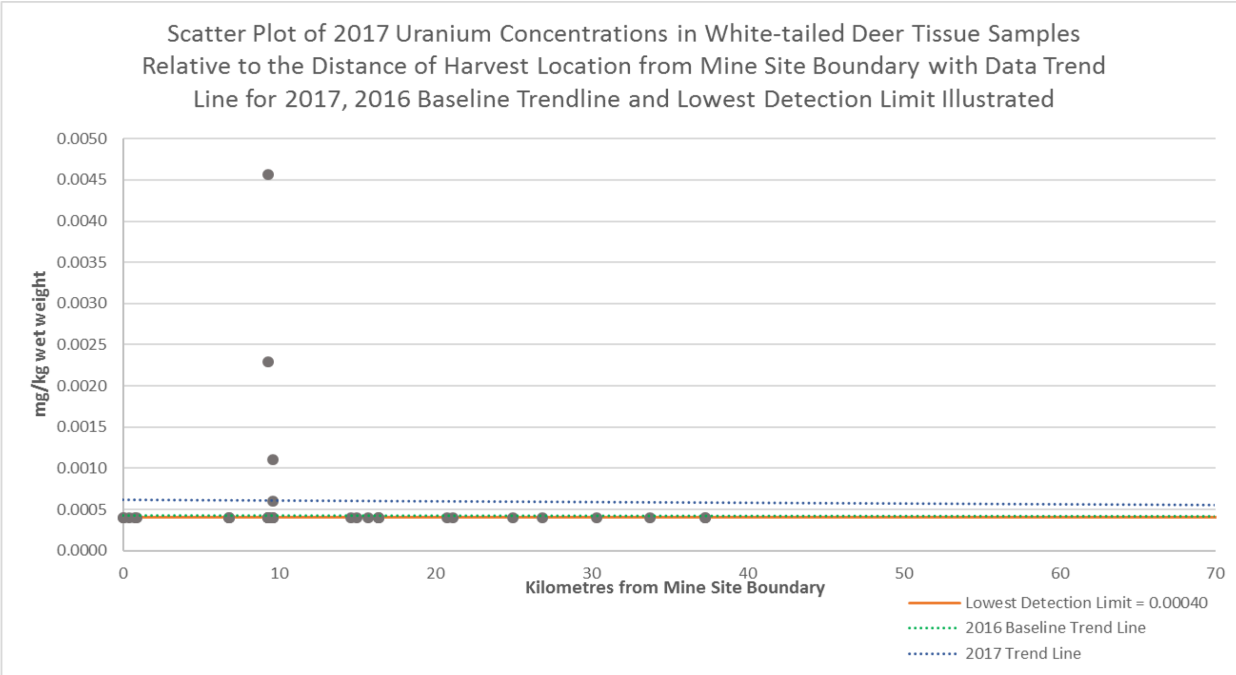

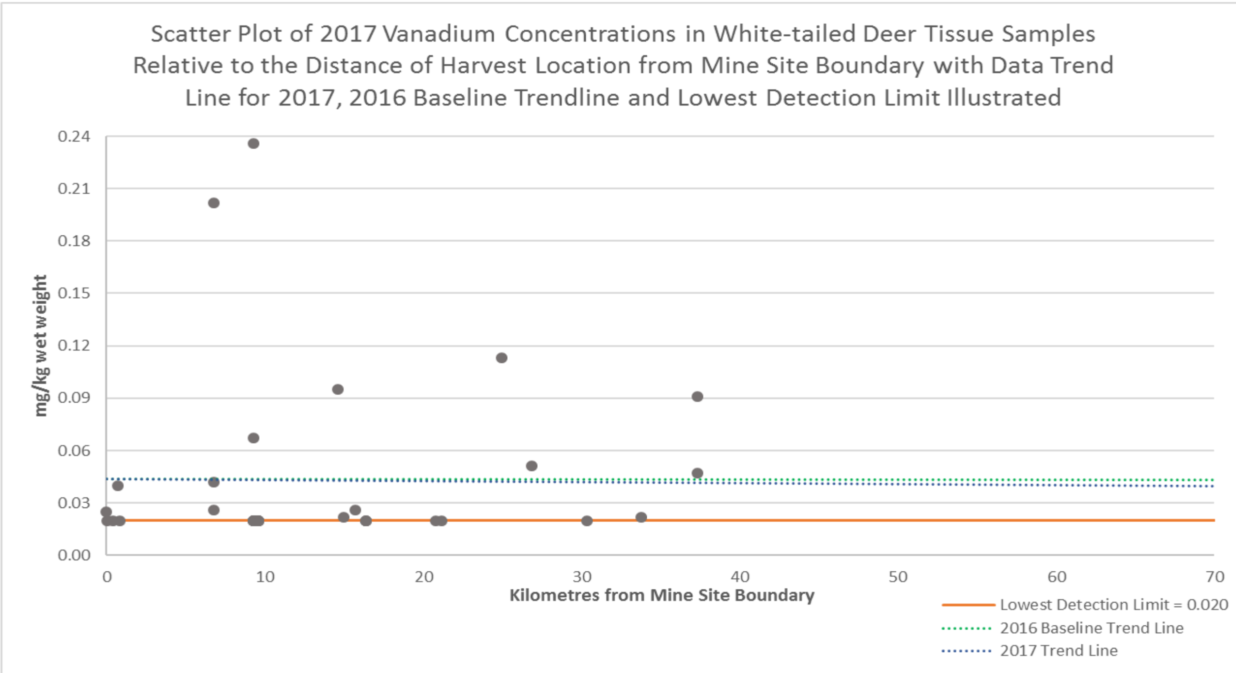

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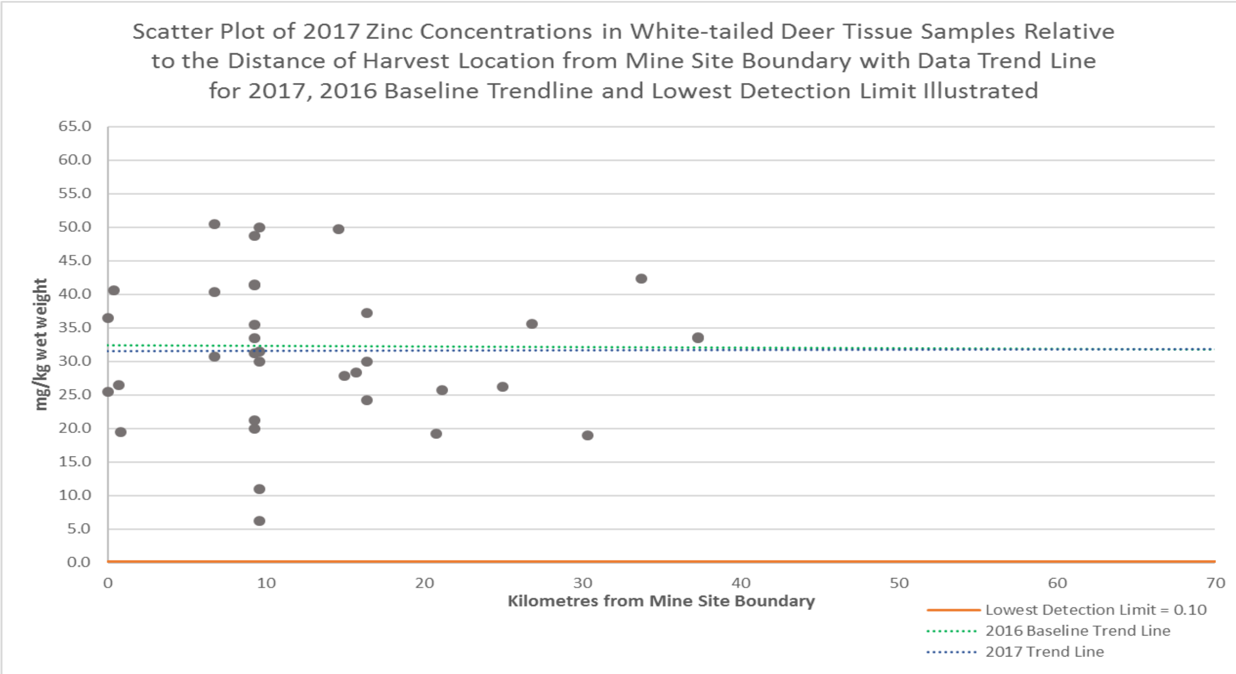

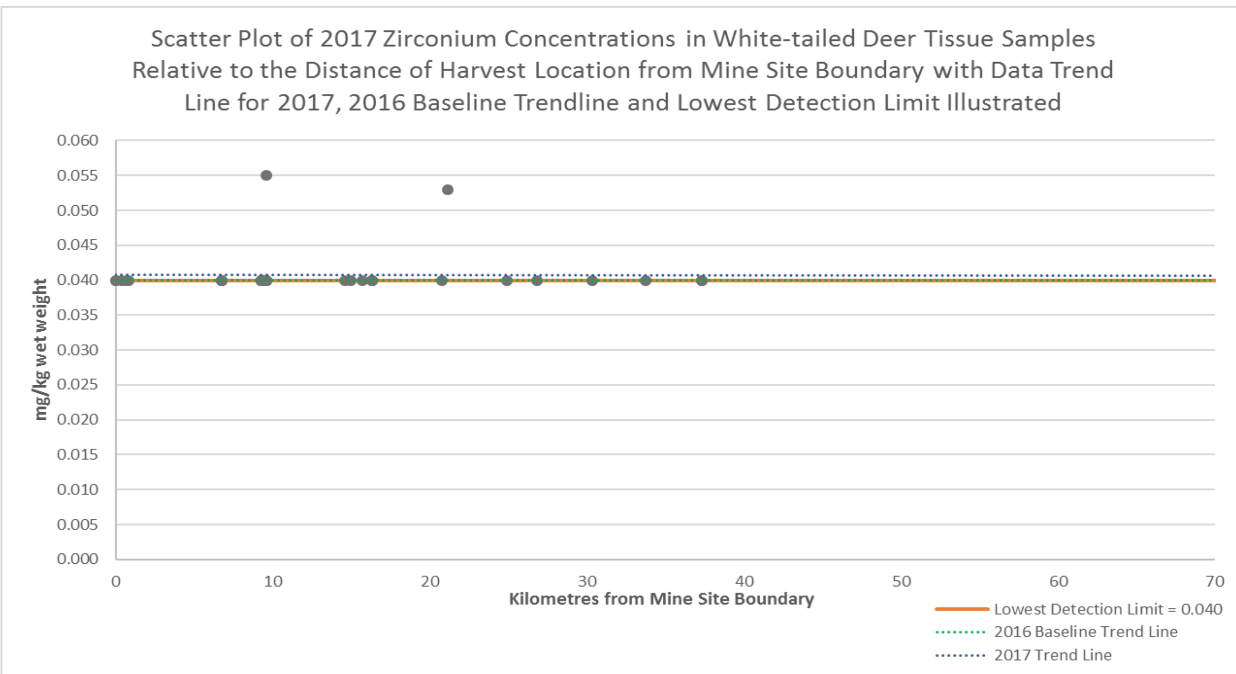

Figure 3-1 (cont'd): Scatter Plots showing 2017 Contaminant Concentrations for White-tailed Deer Tissue Samples relative to the distance of the Harvest Location from the Mine Site Boundary with a Linear Trend Line, 2016 Baseline Trend Line and the Lowest Detection Limit

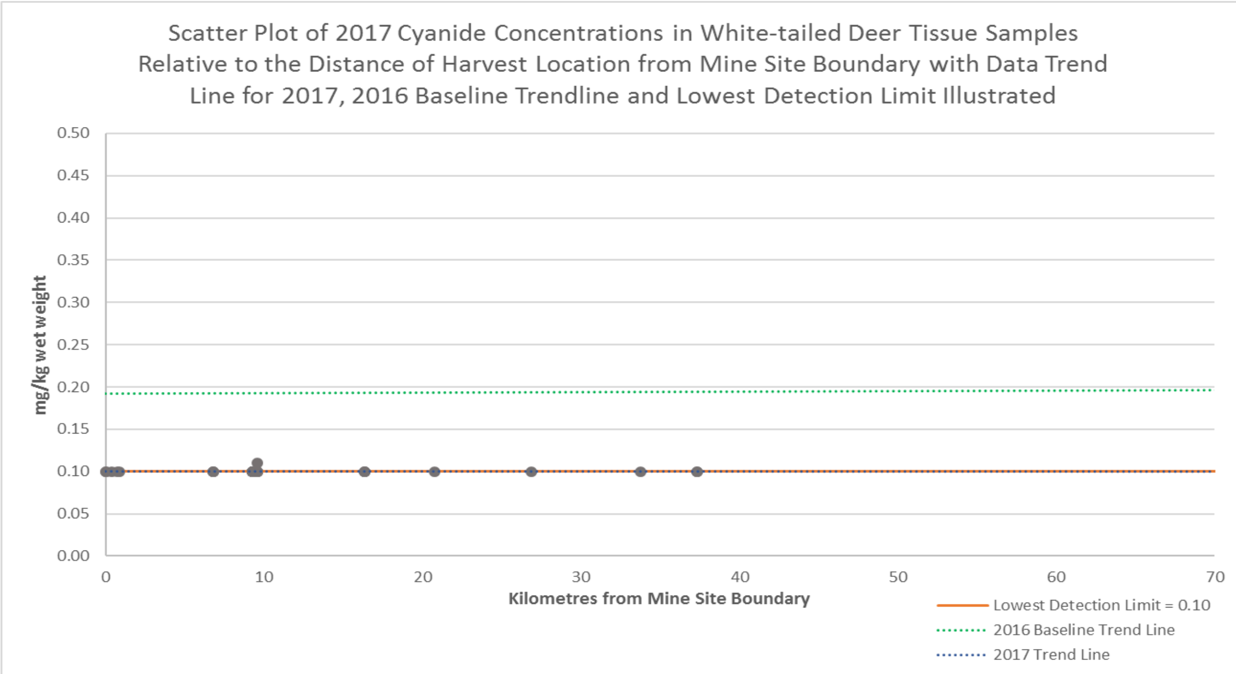

Figure 3-1 (cont'd): Scatter Plots showing 2017 Contaminant Concentrations for White-tailed Deer Tissue Samples relative to the distance of the Harvest Location from the Mine Site Boundary with a Linear Trend Line, 2016 Baseline Trend Line and the Lowest Detection Limit

4.0 DISCUSSION

Wildlife exposure to contaminants such as metals may come from ingestion of effected plants, soil or water that have been exposed to the contaminants. Metal contaminants arise from many sources, including some which occur naturally in the environment, but may also be formed from industry discharges (Oladunjoye et al. 2015). Some of these metals occur naturally in the environment and are required by wildlife in small (trace) amounts for nutrition. While these metals may become toxic at high concentrations, deficiencies in some of these metals can also cause health problems.

There are few published studies on contaminant concentrations in the tissues and organs of deer in Ontario and Canada, and little is known about the normal nutritional requirements of various minerals and elements by deer (Schultz et al. 1994, Khan et al. 1995, Zimmerman et al. 2008). Accordingly, little is known about what the normal baseline concentrations are in deer for the various metals analyzed in this study. Similarly, information is not available regarding what concentrations would be considered detrimental, nor what the effects of detrimental concentrations would be on the physiology of deer.

Direct comparisons between the data collected in this study (including the baseline data) and previous studies are difficult for many reasons, such as differences in variables such as age, sex, habitat, food sources and proximity to anthropogenic sources of contamination, which are all often unknown. Therefore, the baseline data collected in 2016 is assumed to represent the normal variation in the concentration levels of the elements examined in this study for local White-tailed Deer populations. The 2016 results will therefore provide pre-operation data for comparison with 2017 post-operation concentration levels and future study results from data collected as the RRM continues operations. The purpose of these comparisons is to identify any exposure and ecological risk to local wildlife from mine-related contaminants and asses the risks to humans that consume local wildlife should they arise.

Both, the 2016 baseline data and the 2017 data had high variations in the concentrations measured in the tissue samples for several contaminants. Such a high variation in values renders interpretation problematic with only one year of comparison. Two of the donors in the 2017 sample collection (D026 and D030) contained maximum concentration levels for five and six of the parameters, respectively. Most donors contained only one maximum concentration, suggesting something other than the impact of mining activities were causing the elevated contaminant levels in these two individuals. It is possible that their health was otherwise compromised, but the results of this study are unable to confirm this hypothesis. A similar trend was observed in the 2016 dataset, where one donor was discovered to have several elevated contaminant concentrations. The liver of this individual was discoloured, suggesting compromised health. Trends in data will be more obvious as subsequent sampling takes place and more data is available for statistical comparisons.

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6.0 CLOSING

This White-tailed Deer Tissue Sampling Report was prepared by Wood for the sole benefit of New Gold Inc. RRM for specific application to the RRM site. The quality of information, conclusions and estimates contained herein are consistent with the level of effort involved in Wood's services and based on: i) information available at the time of preparation, and ii) the assumptions, conditions and qualifications set forth in this document. This report is intended to be used by New Gold Inc. only, and its nominated representatives, subject to the terms and conditions of its contract with Wood. Any other use of, or reliance on, this report by any third party is at that party's sole risk. This report has been prepared in accordance with generally accepted industry-standard. No other warranty, expressed or implied, is made.

If you require further information regarding the above or the project in general, please contact Dan Russell, Geoscientist, Mining Environmental or Matt Evans, Senior Ecologist, Environmental at (905) 568-2929. Thank you for the opportunity to be of service to New Gold Inc.

Report prepared by:

Rebecca Harris

Becky Harris, B.Sc.
Ecologist

Reviewed by:

Matt Evans

Matt Evans, Ph.D.
Senior Ecologist

newgold Rainy River Project

APPENDIX A

2017 WHITE-TAILED DEER TISSUE CONTAMINANT CONCENTRATION VALUES

	Aluminum (Al)	Antimony (Sb)	Arsenic (As)	Barium (Ba)	Beryllium (Be)	Bismuth (Bi)	Boron (B)	Cadmium (Cd)	Calcium (Ca)	Cesium (Cs)	Chromium (Cr)	Cobalt (Co)	Copper (Cu)	Iron (Fe)	Lead (Pb)	Lithium (Li)	Magnesium (Mg)
Lowest Detection Limit	**0.40**	**0.0020**	**0.0040**	**0.010**	**0.0020**	**0.0020**	**0.20**	**0.0010**	**4.0**	**0.0010**	**0.010**	**0.0040**	**0.020**	**0.60**	**0.0040**	**0.10**	**0.40**
Sample ID																	
D001	**<0.4**	**<0.002**	**<0.004**	0.078	**<0.002**	**<0.002**	0.29	0.221	49.3	0.0186	0.036	0.0555	19.8	143	0.0106	0.18	151
D002	**<0.4**	**0.0061**	**<0.004**	0.047	**<0.002**	**<0.002**	0.31	0.368	44.2	0.0200	**<0.01**	0.0733	90.1	75.5	0.1310	0.52	185
D003	2.34	**<0.002**	0.0066	0.067	**<0.002**	**<0.002**	0.31	0.0420	62.2	0.0129	0.065	0.0688	37.4	87.9	0.0079	0.59	176
D004	**<0.4**	**<0.002**	0.0220	0.043	**<0.002**	**<0.002**	0.30	0.205	54.9	0.0173	0.045	0.0653	68.4	243	**<0.004**	0.53	176
D005	**<0.4**	0.0029	**<0.004**	0.064	**<0.002**	**<0.002**	0.23	0.280	46.1	0.0202	0.012	0.0688	106	98.8	**<0.004**	0.18	154
D006	**<0.4**	**<0.002**	**<0.004**	0.023	**<0.002**	**<0.002**	**<0.2**	1.20	47.1	0.0047	0.015	0.0663	63.2	151	**<0.004**	0.21	176
D007	**<0.4**	**<0.002**	**<0.004**	0.022	**<0.002**	**<0.002**	**<0.2**	0.241	48.7	0.0120	0.022	0.0415	173	188	**<0.004**	0.13	139
D008	0.56	**<0.002**	0.0114	0.045	**<0.002**	**<0.002**	**<0.2**	1.89	44.1	0.0218	0.013	0.0419	17.1	148	0.0048	**<0.1**	181
D009	**<0.4**	**<0.002**	**<0.004**	0.045	**<0.002**	**<0.002**	**<0.2**	0.0888	49.8	0.0034	0.014	0.0526	29.1	155	**<0.004**	**<0.1**	144
D010	**<0.4**	**<0.002**	**<0.004**	0.075	**<0.002**	**<0.002**	**<0.2**	0.167	39.7	0.0049	0.032	0.0422	88.4	165	0.0047	0.72	152
D011	**<0.4**	**<0.002**	**<0.004**	0.017	**<0.002**	**<0.002**	**<0.2**	0.113	38.7	0.0024	**<0.01**	0.0179	22.5	179	0.0655	0.36	174
D012	0.47	**<0.002**	**<0.004**	0.016	**<0.002**	**<0.002**	0.25	0.226	43.5	0.0096	0.034	0.0254	82.2	224	**<0.004**	**<0.1**	144
D013	**<0.4**	0.0025	0.0041	0.035	**<0.002**	**<0.002**	0.25	0.591	52.2	0.0068	0.033	0.0943	101	117	0.0089	**<0.1**	205
D014	**<0.4**	**<0.002**	**<0.004**	0.026	**<0.002**	**<0.002**	**<0.2**	0.147	45.9	0.0075	**<0.01**	0.0433	48.0	207	**<0.004**	0.22	171
D015	**<0.4**	0.0031	**<0.004**	0.024	**<0.002**	**<0.002**	**<0.2**	0.603	59.4	0.0204	**<0.01**	0.0559	82.3	105	**<0.004**	**<0.1**	170
D016	**<0.4**	**<0.002**	**<0.004**	0.039	**<0.002**	**<0.002**	0.30	0.0042	51.1	0.0305	**<0.01**	**<0.004**	0.700	396	**<0.004**	**<0.1**	166
D017	**<0.4**	**<0.002**	0.0175	0.030	**<0.002**	**<0.002**	0.27	1.16	59.7	0.0350	0.360	0.0727	100	142	0.0061	0.24	183
D018	2.63	**<0.002**	**<0.004**	0.042	**<0.002**	**<0.002**	0.22	0.915	52.9	0.0151	0.307	0.0537	57.4	90.2	0.0111	0.19	175
D019	**<0.4**	**<0.002**	**<0.004**	0.105	**<0.002**	**<0.002**	0.28	0.0011	12.7	0.0187	0.046	**<0.004**	0.574	871	0.0113	**<0.1**	47.3
D020	4.22	**<0.002**	0.0044	0.082	**<0.002**	**<0.002**	0.22	0.133	57.4	0.0527	0.254	0.0082	0.836	218	0.0071	**<0.1**	185
D021	0.96	**<0.002**	0.0060	0.071	**<0.002**	**<0.002**	0.21	0.405	65.5	0.0084	0.327	0.0491	25.7	241	0.0108	0.19	141
D022	**<0.4**	**<0.002**	0.0040	0.032	**<0.002**	**<0.002**	**<0.2**	0.524	55.3	0.0545	0.051	0.0528	93.5	181	**<0.004**	**<0.1**	161
D023	**<0.4**	**<0.002**	**<0.004**	0.025	**<0.002**	**<0.002**	0.30	0.0303	49.0	0.0093	0.019	0.0374	40.6	98.7	0.0171	0.11	198
D024	0.67	**<0.002**	**<0.004**	0.026	**<0.002**	**<0.002**	0.35	0.591	52.8	0.0177	0.103	0.0780	73.7	114	**<0.004**	0.11	172
D025	**<0.4**	**<0.002**	0.0091	0.024	**<0.002**	**<0.002**	0.31	0.421	46.9	0.0139	0.270	0.0385	88.7	122	0.0131	0.12	159
D026	0.82	**<0.002**	**<0.004**	0.048	**<0.002**	**<0.002**	**<0.2**	0.338	76.4	0.0454	0.198	0.0615	72.5	233	**<0.004**	**<0.1**	176
D027	0.47	**<0.002**	**<0.004**	0.042	**<0.002**	**<0.002**	0.26	0.283	76.1	0.0049	0.122	0.0501	44.8	106	**<0.004**	**<0.1**	172
D028	3.63	**<0.002**	**<0.004**	0.054	**<0.002**	**<0.002**	0.23	0.742	56.2	0.0149	0.089	0.0515	58.6	100	0.0138	0.19	167
D029	0.54	**<0.002**	**<0.004**	0.027	**<0.002**	**<0.002**	**<0.2**	0.0264	58.7	0.0080	0.049	0.0473	36.1	93.2	0.0048	**<0.1**	188
D030	**<0.4**	**<0.002**	0.0055	0.020	**<0.002**	**<0.002**	**<0.2**	0.0021	44.9	0.104	0.010	0.0041	3.26	49.3	0.0354	**<0.1**	325

	Aluminum (Al)	Antimony (Sb)	Arsenic (As)	Barium (Ba)	Beryllium (Be)	Bismuth (Bi)	Boron (B)	Cadmium (Cd)	Calcium (Ca)	Cesium (Cs)	Chromium (Cr)	Cobalt (Co)	Copper (Cu)	Iron (Fe)	Lead (Pb)	Lithium (Li)	Magnesium (Mg)
Lowest Detection Limit	**0.40**	**0.0020**	**0.0040**	**0.010**	**0.0020**	**0.0020**	**0.20**	**0.0010**	**4.0**	**0.0010**	**0.010**	**0.0040**	**0.020**	**0.60**	**0.0040**	**0.10**	**0.40**
Sample ID																	
D031	0.51	**<0.002**	**<0.004**	0.047	**<0.002**	**<0.002**	**<0.2**	0.442	48.5	0.0089	0.015	0.0727	52.6	124	0.0255	**<0.1**	166
D032	**<0.4**	**<0.002**	**<0.004**	0.070	**<0.002**	**<0.002**	0.22	0.0153	46.6	0.0148	0.021	0.0049	0.643	990	**<0.004**	0.17	108
D033	**<0.4**	**<0.002**	**<0.004**	0.018	**<0.002**	**<0.002**	**<0.2**	0.152	54.4	0.0121	0.049	0.0609	77.8	105	0.0046	**<0.1**	154
D034	**<0.4**	**<0.002**	**<0.004**	0.038	**<0.002**	**<0.002**	**<0.2**	0.519	48.7	0.0108	0.012	0.0778	59.9	129	0.0239	**<0.1**	183
D035	0.53	**<0.002**	**<0.004**	0.046	**<0.002**	**<0.002**	**<0.2**	0.474	48.1	0.0106	0.021	0.0784	62.9	140	0.0238	**<0.1**	177
D036	0.53	**<0.002**	**<0.004**	0.062	**<0.002**	**<0.002**	**<0.2**	1.59	64.2	0.0730	0.037	0.0806	45.1	120	0.0106	**<0.1**	171

- **Values listed in BOLD are the ‘Lowest Detection Limit’ where the actual value recorded was below this limit.**
- **Values are in mg/kg wet weight**

Appendix A – Raw Values Cont'd

	Manganese (Mn)	Mercury (Hg)	Molybdenum (Mo)	Nickel (Ni)	Phosphorus (P)	Potassium (K)	Rubidium (Rb)	Selenium (Se)	Sodium (Na)	Strontium (Sr)	Tellurium (Te)	Thallium (Tl)	Tin (Sn)	Uranium (U)	Vanadium (V)	Zinc (Zn)	Zirconium (Zr)	Cyanide
Lowest Detection Limit	**0.010**	**0.0010**	**0.0040**	**0.040**	**2.0**	**4.0**	**0.010**	**0.010**	**4.0**	**0.010**	**0.0040**	**0.00040**	**0.020**	**0.00040**	**0.020**	**0.10**	**0.040**	**0.10**
Sample ID																		
D001	3.77	0.0021	0.513	**<0.04**	3200	2410	8.55	0.135	1170	0.062	**<0.004**	**<0.0004**	**<0.02**	**<0.0004**	0.047	33.5	**<0.04**	**<0.10**
D002	3.76	0.0040	0.475	**<0.04**	3840	3080	11.0	0.190	805	0.042	**<0.004**	0.00055	**<0.02**	**<0.0004**	0.091	33.6	**<0.04**	**<0.10**
D003	3.40	0.0086	0.722	0.045	3930	2400	12.1	0.528	1060	0.045	**<0.004**	**<0.0004**	**<0.02**	**<0.0004**	0.051	35.6	**<0.04**	**<0.10**
D004	2.23	0.0114	0.622	**<0.04**	4000	3070	15.9	0.897	586	0.020	**<0.004**	**<0.0004**	**<0.02**	**<0.0004**	0.025	36.4	**<0.04**	**<0.10**
D005	3.33	0.0025	0.105	**<0.04**	3730	2970	12.4	0.485	839	0.054	**<0.004**	0.00082	**<0.02**	**<0.0004**	**<0.02**	19.2	**<0.04**	**<0.10**
D006	1.59	0.0031	0.163	**<0.04**	4050	3220	8.72	0.435	778	0.034	**<0.004**	**<0.0004**	**<0.02**	**<0.0004**	**<0.02**	40.6	**<0.04**	**<0.10**
D007	1.76	0.0025	0.194	**<0.04**	3590	2870	13.9	1.85	965	0.025	**<0.004**	**<0.0004**	**<0.02**	**<0.0004**	0.040	26.4	**<0.04**	**<0.10**
D008	1.43	0.0038	0.0592	**<0.04**	4100	2910	14.2	0.189	714	0.027	**<0.004**	**<0.0004**	**<0.02**	**<0.0004**	**<0.02**	33.3	**<0.04**	**<0.10**
D009	2.80	0.0014	0.357	**<0.04**	3270	2670	6.59	0.294	1200	0.035	**<0.004**	**<0.0004**	**<0.02**	**<0.0004**	**<0.02**	25.5	**<0.04**	**<0.10**
D010	1.07	0.0019	0.128	**<0.04**	3560	2790	8.09	1.06	908	0.026	**<0.004**	**<0.0004**	**<0.02**	**<0.0004**	**<0.02**	24.2	**<0.04**	**<0.10**
D011	3.19	**<0.001**	0.628	**<0.04**	3480	3120	6.96	0.447	774	0.013	**<0.004**	**<0.0004**	**<0.02**	**<0.0004**	**<0.02**	37.2	**<0.04**	**<0.10**
D012	2.52	0.0019	0.400	**<0.04**	2790	2550	13.6	0.956	1060	0.025	**<0.004**	0.00046	**<0.02**	**<0.0004**	**<0.02**	29.9	**<0.04**	**<0.10**
D013	4.05	0.0019	0.700	**<0.04**	4530	3490	25.4	0.474	743	0.038	**<0.004**	**<0.0004**	0.031	**<0.0004**	0.022	42.3	**<0.04**	**<0.10**
D014	3.65	0.0021	0.408	**<0.04**	3750	3010	10.1	0.413	736	0.032	**<0.004**	**<0.0004**	**<0.02**	**<0.0004**	**<0.02**	41.3	**<0.04**	**<0.10**
D015	2.44	0.0017	0.136	**<0.04**	3700	2470	18.8	0.620	734	0.168	**<0.004**	0.00042	**<0.02**	0.00229	**<0.02**	35.5	**<0.04**	**<0.10**
D016	0.188	**<0.001**	0.0527	**<0.04**	2330	3600	26.0	0.329	898	0.080	**<0.004**	0.00053	**<0.02**	**<0.0004**	**<0.02**	31.5	**<0.04**	**<0.10**
D017	3.31	0.0109	0.675	0.061	3930	3000	14.1	1.12	1100	0.059	**<0.004**	**<0.0004**	**<0.02**	**<0.0004**	**<0.02**	49.9	**<0.04**	**<0.10**
D018	1.60	0.0034	0.136	**<0.04**	3950	3240	16.4	0.393	807	0.036	**<0.004**	0.00063	**<0.02**	**<0.0004**	**<0.02**	21.2	**<0.04**	**<0.10**
D019	0.066	**<0.001**	0.0104	**<0.04**	671	3150	24.0	0.349	352	0.011	**<0.004**	**<0.0004**	**<0.02**	**<0.0004**	**<0.02**	6.22	**<0.04**	**<0.10**
D020	0.337	0.0014	0.0482	**<0.04**	2690	3720	14.6	0.301	874	0.067	**<0.004**	**<0.0004**	0.026	0.00060	**<0.02**	30.0	**<0.04**	**<0.10**
D021	2.63	0.0031	0.361	**<0.04**	2920	2400	7.15	0.346	1510	0.093	**<0.004**	**<0.0004**	0.042	**<0.0004**	**<0.02**	33.5	**<0.04**	**<0.10**
D022	2.63	0.0048	0.173	**<0.04**	3330	2600	12.2	0.598	1230	0.034	**<0.004**	0.00060	**<0.02**	**<0.0004**	**<0.02**	31.2	**<0.04**	**<0.10**
D023	4.26	0.0017	0.825	**<0.04**	3870	3310	15.9	0.247	687	0.029	**<0.004**	0.00045	0.022	**<0.0004**	0.026	50.4	**<0.04**	**<0.10**
D024	3.55	0.0058	0.810	0.072	3470	2640	15.1	0.553	1110	0.026	**<0.004**	0.00059	0.049	**<0.0004**	0.202	30.7	**<0.04**	**<0.10**
D025	1.21	0.0027	0.156	**<0.04**	3720	2890	11.3	0.850	940	0.029	**<0.004**	0.00083	0.030	**<0.0004**	**<0.02**	19.9	**<0.04**	**<0.10**
D026	3.78	0.0064	0.379	0.076	3370	2150	13.2	0.552	797	0.317	**<0.004**	0.00047	0.050	0.00457	0.236	48.7	**<0.04**	**<0.10**
D027	4.35	0.0018	0.754	0.048	3090	2670	8.85	0.354	1260	0.056	**<0.004**	**<0.0004**	**<0.02**	**<0.0004**	0.042	40.3	**<0.04**	**<0.10**

	Manganese (Mn)	Mercury (Hg)	Molybdenum (Mo)	Nickel (Ni)	Phosphorus (P)	Potassium (K)	Rubidium (Rb)	Selenium (Se)	Sodium (Na)	Strontium (Sr)	Tellurium (Te)	Thallium (Tl)	Tin (Sn)	Uranium (U)	Vanadium (V)	Zinc (Zn)	Zirconium (Zr)	Cyanide
Lowest Detection Limit	**0.010**	**0.0010**	**0.0040**	**0.040**	**2.0**	**4.0**	**0.010**	**0.010**	**4.0**	**0.010**	**0.0040**	**0.00040**	**0.020**	**0.00040**	**0.020**	**0.10**	**0.040**	**0.10**
Sample ID																		
D028	1.54	0.0037	0.138	**<0.04**	3780	3010	16.0	0.389	860	0.043	**<0.004**	0.00077	0.024	**<0.0004**	**<0.02**	19.5	**<0.04**	**<0.10**
D029	3.24	0.0029	0.497	**<0.04**	3790	3260	8.29	0.367	1090	0.038	**<0.004**	0.00042	0.026	**<0.0004**	0.067	41.5	**<0.04**	**<0.10**
D030	0.486	0.0016	0.0248	**<0.04**	3070	4190	20.4	0.367	449	0.070	**<0.004**	0.00172	0.075	0.00110	**<0.02**	11.0	0.055	0.11
D031	2.71	0.0030	0.714	**<0.04**	3560	2510	8.04	0.717	943	0.043	**<0.004**	**<0.0004**	**<0.02**	**<0.0004**	**<0.02**	25.7	0.053	N/A
D032	0.183	**<0.001**	0.0538	**<0.04**	1580	3500	17.5	0.406	810	0.037	**<0.004**	0.00060	**<0.02**	**<0.0004**	**<0.02**	18.9	**<0.04**	N/A
D033	2.44	0.0029	0.547	**<0.04**	3530	2210	37.5	0.323	1120	0.033	**<0.004**	0.00051	**<0.02**	**<0.0004**	0.113	26.2	**<0.04**	N/A
D034	3.11	0.0036	0.845	**<0.04**	4010	2900	9.42	0.783	831	0.038	**<0.004**	**<0.0004**	**<0.02**	**<0.0004**	0.026	28.3	**<0.04**	N/A
D035	3.16	0.0040	0.866	**<0.04**	4040	2830	9.06	0.827	781	0.042	**<0.004**	**<0.0004**	**<0.02**	**<0.0004**	0.022	27.8	**<0.04**	N/A
D036	2.61	0.0071	0.296	**<0.04**	4030	2930	19.0	0.483	894	0.039	**<0.004**	**<0.0004**	**<0.02**	**<0.0004**	0.095	49.7	**<0.04**	N/A

- **Values listed in BOLD are the ‘Lowest Detection Limit’ where the actual value recorded was below this limit.**
- **Values are in mg/kg wet weight**

APPENDIX B

2016 WHITE-TAILED DEER TISSUE CONTAMINANT BASELINE CONCENTRATION VALUES

	Aluminum (Al)	Antimony (Sb)	Arsenic (As)	Barium (Ba)	Beryllium (Be)	Bismuth (Bi)	Boron (B)	Cadmium (Cd)	Calcium (Ca)	Cesium (Cs)	Chromium (Cr)	Cobalt (Co)	Copper (Cu)	Iron (Fe)	Lead (Pb)	Lithium (Li)	Magnesium (Mg)
Lowest Detection Limit	**0.40**	**0.0020**	**0.0040**	**0.010**	**0.0020**	**0.0020**	**0.20**	**0.0010**	**4.0**	**0.0010**	**0.010**	**0.0040**	**0.020**	**0.60**	**0.0040**	**0.10**	**0.40**
Sample ID																	
D001	**<0.4**	0.0022	0.0067	0.037	**<0.002**	**<0.002**	0.25	0.367	40.5	0.293	**<0.01**	0.0467	72.1	113	**<0.004**	0.26	161
D002	**<0.4**	**<0.002**	0.0132	0.089	**<0.002**	**<0.002**	**<0.2**	0.230	41.7	0.0200	**<0.01**	0.0462	105	161	**<0.004**	0.19	152
D003	0.51	**<0.002**	**<0.004**	0.052	**<0.002**	**<0.002**	**<0.2**	0.686	70.4	0.0332	0.263	0.0550	64.3	103	**<0.004**	0.27	164
D004	**<0.4**	**<0.002**	0.0077	0.056	**<0.002**	**<0.002**	0.26	0.759	43.2	0.0822	0.025	0.0492	148	133	**<0.004**	0.39	143
D005	0.58	0.0797	0.0088	0.039	**<0.002**	**<0.002**	0.29	0.310	51.1	0.0335	0.111	0.0648	58.8	96.6	2.52	0.68	177
D006 LIVER ONLY	**<0.4**	**<0.002**	0.0118	0.027	**<0.002**	**<0.002**	**<0.2**	0.527	60.8	0.0302	**<0.01**	0.0367	70.4	151	**<0.004**	0.45	166
D006 LIVER & HEART	**<0.4**	**<0.002**	0.0120	0.022	**<0.002**	**<0.002**	**<0.2**	0.474	58.1	0.0302	**<0.01**	0.0355	67.3	172	**<0.004**	0.46	157
D007	0.41	**<0.002**	**<0.004**	0.110	**<0.002**	**<0.002**	0.24	0.589	41.0	0.0800	0.236	0.0906	110	139	0.0053	0.19	125
D008	**<0.4**	**<0.002**	0.0087	0.075	**<0.002**	**<0.002**	**<0.2**	0.925	57.9	0.270	0.035	0.0665	68.2	141	0.0068	0.26	154
D009	10.2	**<0.002**	0.0065	0.155	**<0.002**	**<0.002**	0.28	0.444	88.1	0.0231	0.043	0.0495	36.8	96.7	0.0728	0.29	160
D010	**<0.4**	**<0.002**	0.0084	0.019	**<0.002**	**<0.002**	0.23	0.582	49.6	0.0136	0.015	0.0672	61.0	236	**<0.004**	0.11	182
D011	**<0.4**	**<0.002**	0.0074	0.019	**<0.002**	**<0.002**	0.24	0.0989	45.5	0.0841	**<0.01**	0.0185	6.85	100	**<0.004**	0.17	202
D012 LIVER ONLY	0.52	0.0033	0.0151	0.021	**<0.002**	0.0025	0.31	0.384	34.0	0.0345	0.011	0.0435	43.5	129	0.104	**<0.1**	157
D013	**<0.4**	**<0.002**	0.0180	0.027	**<0.002**	0.0042	0.52	0.239	49.3	0.0108	**<0.01**	0.0612	94.3	98.7	0.0042	0.36	180
D014	0.47	**<0.002**	**<0.004**	0.055	**<0.002**	**<0.002**	**<0.2**	0.487	54.2	0.0056	**<0.01**	0.0243	191	119	0.0280	0.14	155
D015	0.49	**<0.002**	0.0106	0.029	**<0.002**	**<0.002**	0.50	0.157	49.3	0.0077	**<0.01**	0.0405	143	144	0.0112	0.15	175
D016	**<0.4**	**<0.002**	0.0135	0.020	**<0.002**	0.0060	0.24	0.205	54.3	0.0078	0.127	0.0299	107	125	0.0488	0.32	197
D017	**<0.4**	**<0.002**	0.0139	0.022	**<0.002**	**<0.002**	**<0.2**	0.775	39.4	0.0044	0.039	0.0739	181	153	0.0042	0.32	175
D018	**<0.4**	**<0.002**	0.0176	0.023	**<0.002**	0.0023	0.32	0.184	48.4	0.0260	0.011	0.0397	110	194	0.0076	0.31	171
D019	0.91	0.0031	**<0.004**	0.071	**<0.002**	**<0.002**	0.28	0.0094	29.2	0.0105	0.010	**<0.004**	0.562	901	0.0127	**<0.1**	57.6
D020	0.76	**<0.002**	0.0049	0.024	**<0.002**	**<0.002**	0.20	0.236	39.5	0.0131	0.041	0.0426	106	182	0.0070	0.14	142
D021	**<0.4**	**<0.002**	0.0188	0.017	**<0.002**	0.0036	**<0.2**	0.314	43.3	0.0163	0.140	0.0561	58.5	172	0.0042	0.53	184
D022	1.35	0.0053	0.0066	0.038	**<0.002**	**<0.002**	0.35	0.187	45.7	0.0064	0.026	0.0554	90.0	117	0.267	0.55	174
D023	**<0.4**	**<0.002**	0.0176	0.012	**<0.002**	**<0.002**	0.28	0.183	40.2	0.0141	0.107	0.0532	74.9	192	0.0073	0.16	183
D024	**<0.4**	**<0.002**	0.0205	0.036	**<0.002**	**<0.002**	**<0.2**	0.639	54.1	0.0993	0.169	0.0453	89.0	120	0.0125	**<0.1**	166
D025	0.41	**<0.002**	**<0.004**	0.063	**<0.002**	**<0.002**	0.22	1.98	61.1	0.0085	0.025	0.0528	48.2	140	0.0044	**<0.1**	132
D026	**<0.4**	**<0.002**	0.0044	0.021	**<0.002**	0.0028	0.42	0.0944	59.7	0.0124	0.024	0.0748	42.0	142	0.0093	0.44	162
D027	6.12	**<0.002**	0.0375	0.064	**<0.002**	**<0.002**	**<0.2**	0.719	47.6	0.0412	0.033	0.0515	92.8	91.8	0.0054	0.46	172
D028	9.96	0.0049	0.0180	0.105	**<0.002**	0.0022	0.34	0.781	52.6	0.0654	3.20	0.108	30.7	124	0.0382	0.22	195
D029	**<0.4**	0.0054	0.0079	0.031	**<0.002**	**<0.002**	0.20	1.69	45.1	0.0898	**<0.01**	0.0463	94.6	107	0.0268	**<0.1**	147

	Aluminum (Al)	Antimony (Sb)	Arsenic (As)	Barium (Ba)	Beryllium (Be)	Bismuth (Bi)	Boron (B)	Cadmium (Cd)	Calcium (Ca)	Cesium (Cs)	Chromium (Cr)	Cobalt (Co)	Copper (Cu)	Iron (Fe)	Lead (Pb)	Lithium (Li)	Magnesium (Mg)
Lowest Detection Limit	**0.40**	**0.0020**	**0.0040**	**0.010**	**0.0020**	**0.0020**	**0.20**	**0.0010**	**4.0**	**0.0010**	**0.010**	**0.0040**	**0.020**	**0.60**	**0.0040**	**0.10**	**0.40**
Sample ID																	
D030	0.58	0.0041	0.0092	0.057	**<0.002**	**<0.002**	**<0.2**	0.788	47.9	0.0524	0.017	0.0433	48.4	120	0.0376	**<0.1**	158
D031	1.73	**<0.002**	0.0073	0.034	**<0.002**	0.0026	0.22	0.264	42.6	0.0188	0.032	0.0305	37.8	294	0.0063	0.29	143
D032	**<0.4**	0.0053	0.0090	0.026	**<0.002**	**<0.002**	**<0.2**	1.83	41.5	0.0962	0.016	0.0503	111	111	0.0662	**<0.1**	153
D033	0.56	**<0.002**	0.0075	0.020	**<0.002**	**<0.002**	**<0.2**	0.126	43.9	0.0119	**<0.01**	0.0677	66.7	79.8	0.0102	0.25	159
D034	0.42	**<0.002**	0.0199	0.012	**<0.002**	0.0049	0.27	0.281	55.9	0.0230	0.097	0.0389	124	194	0.0070	0.28	163
D035	0.65	0.281	0.0491	0.084	**<0.002**	0.0067	0.49	0.658	106	0.0617	0.041	0.0488	22.0	102	39.9	0.46	153
D036	0.55	**<0.002**	0.0191	0.023	**<0.002**	**<0.002**	0.34	0.311	43.5	0.0480	0.393	0.0588	128	155	0.0226	0.46	167
D037	**<0.4**	**<0.002**	0.0114	0.051	**<0.002**	**<0.002**	**<0.2**	0.973	46.7	0.0406	**<0.01**	0.0560	67.7	145	0.0045	**<0.1**	162

- **Values listed in BOLD are the 'Lowest Detection Limit' where the actual value recorded was below this limit.**
- **Values are in mg/kg wet weight**

Appendix B – Raw Values Cont'd

	Manganese (Mn)	Mercury (Hg)	Molybdenum (Mo)	Nickel (Ni)	Phosphorus (P)	Potassium (K)	Rubidium (Rb)	Selenium (Se)	Sodium (Na)	Strontium (Sr)	Tellurium (Te)	Thallium (Tl)	Tin (Sn)	Uranium (U)	Vanadium (V)	Zinc (Zn)	Zirconium (Zr)	Cyanide
Lowest Detection Limit	**0.010**	**0.0010**	**0.0040**	**0.040**	**2.0**	**4.0**	**0.010**	**0.010**	**4.0**	**0.010**	**0.0040**	**0.00040**	**0.020**	**0.00040**	**0.020**	**0.10**	**0.040**	**0.10**
Sample ID																		
D001	1.68	0.0108	0.0736	**<0.04**	3950	2900	26.8	1.36	952	0.033	**<0.004**	0.00193	**<0.02**	**<0.0004**	**<0.02**	24.8	**<0.04**	0.27
D002	0.789	0.0049	0.102	**<0.04**	3720	2540	22.6	1.39	684	0.014	**<0.004**	**<0.0004**	**<0.02**	**<0.0004**	**<0.02**	22.7	**<0.04**	0.13
D003	1.41	0.0110	0.130	0.170	3780	3000	20.9	1.20	853	0.041	**<0.004**	0.00072	**<0.02**	**<0.0004**	**<0.02**	51.8	**<0.04**	0.31
D004	1.36	0.0096	0.0904	**<0.04**	3720	2440	32.5	1.88	813	0.052	**<0.004**	0.00042	0.038	**<0.0004**	0.024	37.0	**<0.04**	**<0.10**
D005	1.73	0.0042	0.170	0.072	4040	2820	24.5	0.609	749	0.030	**<0.004**	0.00091	**<0.02**	**<0.0004**	**<0.02**	29.6	**<0.04**	0.28
D006 LIVER ONLY	1.10	0.0033	0.0834	**<0.04**	3820	3030	13.8	0.922	699	0.056	**<0.004**	**<0.0004**	**<0.02**	**<0.0004**	**<0.02**	20.5	**<0.04**	0.35
D006 LIVER & HEART	1.06	0.0031	0.0792	**<0.04**	3640	2900	13.6	0.903	676	0.050	**<0.004**	**<0.0004**	**<0.02**	**<0.0004**	**<0.02**	19.8	**<0.04**	0.16
D007	2.13	0.0061	0.125	0.165	2860	2260	20.2	0.863	783	0.089	**<0.004**	0.00081	0.034	**<0.0004**	0.059	19.0	**<0.04**	0.41
D008	1.57	0.0040	0.0851	**<0.04**	3580	2860	24.9	1.51	838	0.079	**<0.004**	0.00078	0.043	**<0.0004**	**<0.02**	20.5	**<0.04**	0.33
D009	3.07	0.0060	0.178	**<0.04**	3620	2620	20.1	0.560	927	0.075	**<0.004**	0.00055	**<0.02**	0.00058	0.135	61.0	**<0.04**	0.20
D010	3.64	0.0033	0.458	**<0.04**	4150	2910	7.08	0.198	852	0.021	**<0.004**	**<0.0004**	0.035	**<0.0004**	0.048	33.9	**<0.04**	0.18
D011	1.23	0.0054	0.345	**<0.04**	2820	2860	11.6	0.267	1050	0.014	**<0.004**	**<0.0004**	**<0.02**	**<0.0004**	**<0.02**	31.4	**<0.04**	0.20
D012 LIVER ONLY	2.60	0.0053	0.575	**<0.04**	3350	2190	20.7	0.473	1110	0.010	**<0.004**	0.00174	0.023	**<0.0004**	0.034	29.3	**<0.04**	0.17
D013	3.26	0.0029	0.775	**<0.04**	3650	2420	14.3	1.34	579	0.059	**<0.004**	0.00109	0.029	**<0.0004**	0.035	32.6	**<0.04**	0.18
D014	1.60	0.0024	0.180	**<0.04**	3650	2970	14.7	1.49	612	0.035	**<0.004**	**<0.0004**	0.021	**<0.0004**	0.033	42.4	**<0.04**	**<0.10**
D015	2.55	0.0100	0.357	**<0.04**	3770	2820	24.7	1.33	684	0.013	**<0.004**	0.00080	0.027	**<0.0004**	0.055	45.3	**<0.04**	0.10
D016	0.969	0.0020	0.0873	0.088	4430	2950	20.8	1.25	732	0.012	**<0.004**	0.00049	0.034	**<0.0004**	**<0.02**	33.3	**<0.04**	0.12
D017	2.94	0.0052	0.686	**<0.04**	3640	2660	18.3	1.63	863	0.014	**<0.004**	**<0.0004**	0.038	**<0.0004**	0.075	40.7	**<0.04**	0.11
D018	2.75	0.0064	0.198	**<0.04**	4150	2760	11.1	1.44	893	0.018	**<0.004**	0.00055	0.037	**<0.0004**	0.037	34.6	**<0.04**	**<0.10**
D019	0.138	**<0.001**	0.0269	**<0.04**	853	3650	7.00	0.318	413	0.030	**<0.004**	0.00041	**<0.02**	**<0.0004**	**<0.02**	10.4	**<0.04**	**<0.10**
D020	2.97	0.0029	0.331	0.059	3140	2670	10.9	0.528	861	0.024	**<0.004**	**<0.0004**	0.072	**<0.0004**	0.089	30.1	**<0.04**	0.18
D021	3.45	0.0024	0.688	0.084	3550	2690	11.1	0.518	976	0.013	**<0.004**	**<0.0004**	0.037	**<0.0004**	**<0.02**	37.7	**<0.04**	**<0.10**
D022	3.07	0.0026	0.565	**<0.04**	3480	2850	7.38	0.550	734	0.027	**<0.004**	0.00066	0.055	**<0.0004**	0.082	41.6	**<0.04**	**<0.10**
D023	3.02	0.0040	0.824	0.072	3710	3110	29.8	0.559	626	**<0.01**	**<0.004**	0.00052	**<0.02**	**<0.0004**	**<0.02**	35.3	**<0.04**	0.17
D024	3.76	0.111	0.623	0.108	3870	2530	20.9	0.545	1220	0.026	**<0.004**	0.00082	0.022	**<0.0004**	**<0.02**	27.7	**<0.04**	0.14
D025	2.30	0.0051	0.401	**<0.04**	2790	1310	6.69	0.354	1440	0.029	**<0.004**	**<0.0004**	0.086	**<0.0004**	0.059	24.0	**<0.04**	0.27
D026	1.37	0.0076	0.280	**<0.04**	3320	2550	12.9	0.522	1020	0.029	**<0.004**	0.00064	0.022	**<0.0004**	0.075	28.2	**<0.04**	0.18

	Manganese (Mn)	Mercury (Hg)	Molybdenum (Mo)	Nickel (Ni)	Phosphorus (P)	Potassium (K)	Rubidium (Rb)	Selenium (Se)	Sodium (Na)	Strontium (Sr)	Tellurium (Te)	Thallium (Tl)	Tin (Sn)	Uranium (U)	Vanadium (V)	Zinc (Zn)	Zirconium (Zr)	Cyanide
Lowest Detection Limit	**0.010**	**0.0010**	**0.0040**	**0.040**	**2.0**	**4.0**	**0.010**	**0.010**	**4.0**	**0.010**	**0.0040**	**0.00040**	**0.020**	**0.00040**	**0.020**	**0.10**	**0.040**	**0.10**
Sample ID																		
D027	1.09	0.0151	0.0963	**<0.04**	3830	2970	16.8	1.23	627	0.022	**<0.004**	**<0.0004**	0.058	**<0.0004**	0.084	21.8	**<0.04**	0.34
D028	3.91	0.0151	0.726	1.50	4010	3240	26.6	0.419	813	0.049	**<0.004**	0.00112	0.034	0.00108	0.048	47.4	**<0.04**	0.32
D029	3.02	0.0056	0.419	0.056	3250	2870	13.2	0.792	799	0.020	**<0.004**	**<0.0004**	**<0.02**	**<0.0004**	**<0.02**	29.8	**<0.04**	0.12
D030	3.32	0.0058	0.367	**<0.04**	3340	2690	21.5	0.592	736	0.049	**<0.004**	**<0.0004**	**<0.02**	**<0.0004**	0.113	37.4	**<0.04**	0.11
D031	2.34	0.0041	0.310	**<0.04**	2640	2660	7.96	0.486	880	0.052	**<0.004**	**<0.0004**	0.029	**<0.0004**	0.094	33.4	**<0.04**	0.14
D032	3.21	0.0058	0.456	**<0.04**	3440	3070	14.2	0.868	694	0.018	**<0.004**	**<0.0004**	0.055	**<0.0004**	0.038	32.1	**<0.04**	0.20
D033	3.28	0.0016	0.510	**<0.04**	3300	2780	18.7	0.417	547	0.024	**<0.004**	**<0.0004**	**<0.02**	**<0.0004**	0.065	32.8	**<0.04**	0.18
D034	1.36	0.0043	0.116	0.066	3610	2700	29.7	1.29	791	**<0.01**	**<0.004**	0.00052	**<0.02**	**<0.0004**	**<0.02**	25.1	**<0.04**	0.28
D035	2.72	0.0109	0.698	**<0.04**	2980	2170	24.1	0.410	1250	0.087	**<0.004**	0.00073	0.057	**<0.0004**	0.029	34.0	**<0.04**	0.23
D036	4.14	0.0091	0.953	0.259	3340	2650	15.8	0.937	568	**<0.01**	**<0.004**	0.00048	0.031	**<0.0004**	**<0.02**	43.3	**<0.04**	0.27
D037	1.13	0.0052	0.0867	**<0.04**	3780	2940	24.3	1.32	601	0.031	**<0.004**	0.00048	**<0.02**	**<0.0004**	**<0.02**	20.2	**<0.04**	0.13

- **Values listed in BOLD are the 'Lowest Detection Limit' where the actual value recorded was below this limit.**
- **Values are in mg/kg wet weight**

APPENDIX C

COMPARISON OF KEY CONTAMINANT VALUES BETWEEN 2016 BASELINE DATA AND 2017 EARLY OPERATIONS DATA

Contaminant	Lowest Detection Limit (mg/kg ww)	Minimum (mg/kg ww)			Maximum (mg/kg ww)			Mean (mg/kg ww)			Median (mg/kg ww)		
		2017	2016	Difference	2017	2016	Difference	2017	2016	Difference	2017	2016	Difference
Aluminum	0.40	<0.40	<0.40	--	4.22	10.2	-5.98	0.524 – 0.769	0.978 – 1.178	-0.454 - (-0.409)	<0.40	0.205 – 0.405	≤0.195 – (-0.005)
Antimony	0.0020	<0.0020	<0.0020	--	0.0061	0.2810	-0.2749	0.0004 – 0.0022	0.0104 – 0.0119	-0.01 - (-0.0097)	<0.0020	<0.0020	--
Arsenic	0.0040	<0.0040	<0.0040	--	0.0220	0.0491	-0.0271	0.0025 – 0.0054	0.0118 – 0.0123	-0.0093 – (-0.0069)	<0.0040	0.0091	≤-0.0051
Barium	0.010	0.016	0.012	+0.04	0.105	0.155	-0.05	0.044	0.044	--	0.042	0.033	+0.01
Beryllium	0.0020	<0.0020	<0.0020	--	<0.0020	<0.0020	--	<0.0020	<0.0020	--	<0.0020	<0.0020	--
Bismuth	0.0020	<0.0020	<0.0020	--	<0.0020	0.0067	≤0.0047	<0.0020	0.0010 – 0.0025	≥0.001 – (-0.0005)	<0.0020	<0.0020	--
Boron	0.20	<0.20	<0.20	--	0.35	0.52	-0.17	0.14 – 0.24	0.19 – 0.27	-0.05 – (-0.03)	0.215	0.24	-0.025
Cadmium	0.0010	0.0011	0.009	-0.0079	1.89	1.980	-0.09	0.4175	0.539	-0.1215	0.2815	0.414	-0.1325
Calcium	4.0	12.7	29.2	-16.5	76.4	106.0	-29.6	51.4	50.6	+0.8	49.6	47.8	+1.8
Cesium	0.0010	0.0024	0.0044	-0.002	0.104	0.2930	-0.189	0.0207	0.0479	-0.0272	0.0144	0.0281	-00137
Chromium	0.010	<0.010	<0.010	--	3.6	3.2	+0.4	0.0744 – 0.0759	0.139 – 0.142	-0.0646 – (-0.0661)	0.0335	0.025	+0.085
Cobalt	0.0040	<0.0040	<0.0040	--	0.0943	0.1080	-0.0137	0.0498 – 0.0500	0.0505 – 0.0506	-0.0007 – (-0.0006)	0.0527	0.0494	+0.0033
Copper	0.020	0.574	0.6	-0.026	173.0	191.0	-18	56.2	80.8	-24.6	58.0	71.3	-13.3
Iron	0.60	49.3	79.8	-30.5	990.0	901.0	+89	193.1	160.4	+32.7	141.0	136.0	+5
Lead	0.0040	<0.0040	<0.0040	--	0.131	39.9*	-39.77	0.0126 – 0.0141	1.1385 – 1.1393	-1.126 – (-1.125)	0.00545	0.0072	-000175
Lithium	0.10	<0.10	<0.10	--	0.72	0.68	+0.04	0.14 – 0.19	0.25 – 0.27	-0.11 – (-0.08)	<0.10 – 0.11	0.26	≤-0.16 – (-0.15)
Magnesium	0.40	47.3	57.6	-10.3	325.0	202.0	+123	168.7	161.2	+7.5	171.5	162.0	+9.5
Manganese	0.010	0.066	0.14	-0.074	4.35	4.14	+0.21	2.455	2.29	+0.165	2.63	2.45	+0.18
Mercury	0.0010	<0.0010	<0.0010	--	0.0114	0.1110	-0.0996	0.0033 – 0.0034	0.0085 – 0.0086	-0.0052	0.0028	0.0052	-0.0024
Molybdenum	0.0040	0.0248	0.0269	-0.0021	0.8660	0.9530	-0.087	0.3881	0.3488	+0.0393	0.3700	0.3205	+0.0495
Nickel	0.040	<0.040	<0.040	--	0.076	1.5	-1.424	0.008 – 0.043	0.071 – 0.098	-0.063 – (-0.055)	<0.040	<0.040	--
Phosphorus	2.0	671.0	853.0	-182	4530.0	4430.0	+100	3451.4	3488.8	-37.4	3645.0	3630.0	+15

Potassium	4.0	2150.0	1310.0	+840	4190.0	3650.0	+540	2937.2	2737.1	+200.1	2920.0	2800.0	+120
Rubidium	0.010	6.59	6.7	-0.11	37.5	32.5	+5	14.2	18.0	-3.8	13.4	18.5	-5.1
Selenium	0.010	0.135	0.198	-0.063	1.85	1.880	-0.03	0.545	0.876	-0.331	0.441	0.828	-0.387
Sodium	4.0	352.0	413.0	-61	1510.0	1440.0	+70	900.4	814.3	+86.1	867	795.0	+72
Strontium	0.010	0.011	<0.010	≥0.001	0.317	0.089	+0.228	0.0518	0.033 – 0.034	+0.0188 – 0.0178	0.038	0.028	+0.01
Tellurium	0.0040	<0.0040	<0.0040	--	<0.0040	<0.0040	--	<0.0040	<0.0040	--	<0.0040	<0.0040	--
Thallium	0.00040	<0.00040	<0.00040	--	0.00172	0.00193	-0.00021	0.00029 – 0.00051	0.00045 – 0.00062	-0.00016 – (-0.00011)	<0.00040	0.00048	≤-0.00008
Tin	0.020	<0.020	<0.020	--	0.075	0.086	-0.011	0.010 – 0.025	0.024 – 0.032	-0.014 – (-0.007)	<0.020	0.025	≤-0.005
Uranium	0.00040	<0.00040	<0.00040	--	0.00457	0.00108	+0.00349	0.00024 – 0.00059	0.00004 – 0.00042	+0.0002 – 0.00017	<0.00040	<0.00040	--
Vanadium	0.020	<0.020	<0.020	--	0.236	0.135	+0.101	0.031 – 0.042	0.035 – 0.043	-0.004 – (-0.001)	<0.020	0.031	≤-0.011
Zinc	0.10	6.22	10.4	-4.18	50.4	61.0	-10.6	31.6	32.2	-0.6	31.3	32.4	-1.1
Zirconium	0.040	<0.040	<0.040	--	0.055	<0.040	≥0.016	0.003 – 0.041	<0.040	≥-0.037 – (+0.001)	<0.040	<0.040	--
Cyanide	0.10	<0.10	<0.10	--	0.11	0.41	-0.3	0.004 – 0.10	0.177 – 0.193	-0.173 – (-0.093)	<0.10	0.18	≤-0.08