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Technical Report Overview

Report: Updates to the Lotic and Lentic Statistical Bioaccumulation Models for Selenium in the Elk Valley

Overview: This report summarizes the updates to the lotic and lentic statistical bioaccumulation models for selenium in the Elk Valley. Ongoing monitoring data and historical datasets were used to re-parameterize the models and evaluate aqueous sulphate as a candidate inhibitor of selenate uptake, and to account for its effects as warranted.

This report was prepared for Teck by Golder Associates Ltd.

For More Information

If you have questions regarding this report, please:

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Future studies will be made available at **teck.com/elkvalley.**

TECHNICAL MEMORANDUM

DATE 27 November 2020 **Project No.** 19133414/TM01/Rev0

TO Dr. Mariah Arnold
Teck Coal Limited

CC

FROM Sean Engelking, Adrian de Bruyn **EMAIL** sean_engelking@golder.com, adebruyn@golder.com

UPDATES TO THE LOTIC AND LENTIC STATISTICAL BIOACCUMULATION MODELS FOR SELENIUM IN THE ELK VALLEY

Golder Associates Ltd. (Golder) is pleased to provide Teck Coal Limited (Teck) with the following memorandum reporting on tasks to reduce uncertainties in Adaptive Management Plan (AMP) Management Question 2 (MQ2: *Will the aquatic ecosystem be protected by meeting the long-term site performance objectives?*). This memorandum describes analyses undertaken for Task 4: Bioaccumulation Model Validation and Refinement, as described in the MQ2 study plan (Golder 2019). Specifically, this memorandum describes updates to the selenium bioaccumulation models for lotic and lentic aquatic environments that were developed for the Elk Valley Water Quality Plan (EVWQP) and Teck's Regional Aquatic Effects Monitoring Program (RAEMP).

The focus of this memorandum is on updating statistical bioaccumulation models to calculate expected tissue selenium concentrations in biota. These expected concentrations will be used for comparison to monitoring data collected under the RAEMP and local monitoring programs in lotic and lentic areas. The updated models presented herein will thereby support reducing uncertainties in AMP Management Question 5 (*Does monitoring indicate that mine-related changes in aquatic ecosystem conditions are consistent with expectations?*).

1.0 INTRODUCTION

Bioaccumulation models are used to help understand how changes to concentrations and/or speciation of selenium in water will affect concentrations in biota, and these models thereby support the assessment and management of potential effects of selenium to aquatic life. Teck currently applies two selenium bioaccumulation modelling approaches: 1) the statistical bioaccumulation models developed for the EVWQP (Teck 2014) and RAEMP (Orr et al. 2012); and 2) the speciation bioaccumulation tool developed more recently to account for the influence of changes in selenium speciation, such as have been observed downstream of Teck's Active Water Treatment Facility (AWTF) on Line Creek (Golder 2018a). A third approach of mechanistic biokinetic modelling is currently under development to help understand the effect of time-varying selenium exposures (Windward 2019).

This memorandum reports on updates to the statistical bioaccumulation models used to evaluate monitoring data under the RAEMP and local monitoring programs. These updates involved recalculating equations for lotic and lentic models and identifying provisional criteria for classifying sites in terms of whether they are likely to exhibit lentic-type bioaccumulation (Sections 2.1 and 2.2 of the Golder 2020a study design). Updates to the speciation bioaccumulation tool, or 'b-tool' (Section 2.3 of the Golder 2020a study design) will be reported under separate cover. Biokinetic model development will continue under a separate study design specific to that program and is not discussed herein.

Teck periodically updates the selenium bioaccumulation models as specified in Permit 107517, issued by BC Ministry of Environment and Climate Change Strategy (ENV) under the provisions of the *Environmental Management Act* on 19 November 2015 and most recently amended 25 August 2018. Section 10.6 of Permit 107517 states:

> *The RAEMP* <Regional Aquatic Effects Monitoring Program> *report for the first approved cycle under the ABMP* <Area-based Management Plan> *must be submitted to the Director by September 30, 2017 and by November 30 of the final year of each subsequent three year monitoring cycle.* […] *Each report will, on a three year cycle, verify and calibrate the selenium bioaccumulation model using the most recent three years of water quality, aquatic effects and other data from any special studies undertaken.*

The focus of the analysis presented herein is on evaluating and updating model equations that describe the initial uptake of selenium from water. The initial uptake step is the largest step in the selenium bioaccumulation process, typically representing an increment in concentrations from micrograms per litre (µg/L) in water to milligrams per kilogram dry weight (mg/kg dw) in biota. The initial uptake step is also the most variable step, with concentration ratios between periphyton and water in Elk Valley monitoring data ranging over several orders of magnitude (Golder 2018a). Following the approach taken for the EVWQP (discussed further below), this analysis models bioaccumulation of selenium into periphyton combined with trophic transfer from periphyton to benthic invertebrates in a single equation. The benefit of this approach, in addition to avoiding various sources of uncertainty that affect periphyton tissue analysis, is that the models can incorporate the large dataset of benthic invertebrate selenium data collected by Teck under a wide range of conditions over more than a decade of monitoring.

The remainder of this memorandum presents evaluation and updates to the lotic (Section 2.0) and lentic (Section 3.0) bioaccumulation models. Each section contains details regarding newly available data, statistical analysis, evaluation of candidate models, a final selected model, and residual uncertainty. Development of criteria for inclusion in the lentic model is also presented in Section 3.0.

2.0 LOTIC MODEL UPDATES

2.1 Overview of 2014 EVWQP Model

A selenium bioaccumulation model was derived for the EVWQP (Teck 2014) to characterize the prevailing patterns of selenium bioaccumulation in most aquatic habitats of the Elk Valley. Previous analyses conducted for the RAEMP identified distinct patterns of bioaccumulation in lotic and lentic study areas (Orr et al. 2012). However, the spatial distribution of these different patterns in the Elk Valley had not been well characterized at that time. A field study was therefore conducted in 2013 to characterize how bioaccumulation varied across sites with a range of lentic habitat characteristics and to delineate the prevalence of areas with lentic-type bioaccumulation in the Elk Valley (Appendix A to Annex E of Teck 2014). Only three of 70 lentic study areas were identified in this field study as exhibiting enhanced bioaccumulation distinct from that observed in lotic areas. Most of the apparently lentic areas studied, although possessing some degree of visible lentic characteristics (e.g., fine sediments, slow flow, and/or aquatic vegetation, per Buffagni et al. 2010), exhibited selenium bioaccumulation within the range observed in lotic areas. These areas were provisionally classified as “semi-lentic” and were included in EVWQP model development. The distinct lentic data were excluded from model development, and the EVWQP model was thus derived to characterize bioaccumulation under the lotic and semi-lentic conditions that predominate in the Elk Valley. Bioaccumulation in the distinct lentic areas (Clode Settling Pond, Goddard Marsh, and Fording Oxbow) was modelled in the EVWQP using the Orr et al. (2012) model (Section 1.1.2).

The underlying theory, modelling framework, dataset, statistical derivation, supporting analyses, and evaluation of the EVWQP model are described in detail in Annex E of the EVWQP (Teck 2014). A summary is provided here for convenience. In brief, the EVWQP model was derived to describe the bioaccumulation of aqueous selenium by periphyton and subsequent trophic transfer to benthic invertebrates, fish, and aquatic-feeding birds. These processes were modelled as a series of regression equations derived from a dataset of paired selenium concentrations in water and biota measured at dozens of sites throughout the Elk Valley over several decades of studies and monitoring. Statistical techniques used to derive and evaluate these equations included ordinary least-squares linear regression, piecewise regression, linear mixed-effects models, and analysis of covariance. A range of model forms was evaluated for each uptake and trophic transfer step, and a range of overall model structures was evaluated to identify a final set of model equations that would provide statistically reliable predictions of selenium bioaccumulation with inherent conservatism to account for uncertainty. Model equations were derived to predict both the mean and the expected distribution of selenium concentrations around the modelled mean at each level in the aquatic food web.

The final set of model equations selected for the EVWQP was a two-step model. The first step described the combined uptake of aqueous selenium into periphyton and trophic transfer from periphyton to benthic invertebrates in a single model equation. Combining these two processes into a single equation resulted in improved model performance relative to modelling the processes separately. The second step described trophic transfer of bioaccumulated selenium from benthic invertebrate prey to fish or aquatic-feeding birds.

The first step of the EVWQP model directly translates aqueous selenium concentrations (in µg/L) to concentrations in invertebrate tissue (in mg/kg dw) as:

$$log_{10}[Se]_{inv} = 0.696 + 0.184 \times log_{10}[Se]_{aq} \qquad (1)$$

Equation 1 (r^2=0.38) was derived from a total of 291 data pairs, 184 of which were collected at lotic sites and 107 of which were collected at semi-lentic sites. Aqueous selenium concentrations in this dataset ranged from 0.05 to 693 µg/L.

2.2 Approach to Updating the Lotic Model

The approach to updating the lotic model was to incorporate new data into the lotic dataset and compare the distribution of this updated dataset to the existing EVWQP model (Section 2.2.1), focus on sites that characterize the typical pattern of lotic-type bioaccumulation (Section 2.2.2), and then derive (Section 2.2.3) and evaluate (Section 2.2.4) a set of candidate updated models that describe that typical pattern. As discussed further below, comparison of the updated dataset to the existing EVWQP model indicated that the model tends to over-estimate bioaccumulation at most lotic sites with aqueous selenium concentrations >10 µg/L. This tendency for over-estimation was accepted during EVWQP model development as a way to account for observed variability in bioaccumulation (Annex O of Teck 2014). The evaluation in Section 2.2.2 explains some of that variability and provides a basis for developing an updated model that describes more accurately the expected pattern of bioaccumulation at most lotic sites.

2.2.1 Updates to Dataset and Evaluation of Existing Model

The dataset for the lotic bioaccumulation model was updated to incorporate data from sampling programs conducted in the Elk Valley since the EVWQP, including those summarized in the most recent update in 2017 (Golder 2018b) and more recent data. Data were included from the original EVWQP dataset only for sites classified in the sampling program as 'lotic' (*n*=184). Data from the EVWQP for semi-lentic sites were included in the lentic model evaluation in Section 3. The rationale for focusing the model update on lotic data only is discussed further below.

New data were obtained from:

- Line Creek Operations (LCO) Local Aquatic Effects Monitoring Program (LAEMP) (Minnow 2019)
- Elk River Watershed Regional Aquatic Effects Monitoring Program (RAEMP) Report (Minnow 2020, in prep.)
- A database of paired invertebrate tissue and water chemistry data provided by Minnow in two Excel files for September (2012 – 2019) and other months (2017 – 2019).

A total of 591 paired data for lotic sites in the Elk Valley were added to the dataset as part of the present update, for a total of 775 data points reflecting samples collected from 1996 to 2019 in lotic areas throughout the Elk Valley. Following decisions made during the EVWQP, two samples with invertebrate selenium concentrations ≤1 mg/kg were identified as biologically unrealistic and potentially erroneous and were excluded from model derivation. The compiled lotic dataset is provided in Attachment A.

As outlined in the study design (Golder 2020a), aqueous sulphate concentration was added as a candidate predictor to try to model the inhibitory effect of sulphate on bioaccumulation of selenate (Lo et al. 2014; Van Geest et al. 2016). Concurrent and co-located aqueous sulphate data were compiled following the pairing rules outlined for aqueous selenium in Annex E of the EVWQP (Teck 2014). Paired sulphate data were available for 740 of 775 cases in the lotic dataset.

Visual inspection of the updated dataset (Figure 1) indicates that variability in invertebrate selenium concentrations increases with increasing aqueous selenium concentration and that most data points at aqueous selenium concentrations higher than 10 µg/L fall below the EVWQP model, whereas more data points fall above the EVWQP model line at aqueous selenium concentrations below 10 µg/L. The structure of model residuals (Figure 2) also shows this pattern. These plots indicate that the existing EVWQP model will tend to over-predict bioaccumulation at most lotic sites with aqueous selenium concentrations >10 µg/L.

In part the tendency for over-prediction apparent on Figures 1 and 2 reflects the approach to modelling taken in the EVWQP, in which decisions were made to account for uncertainty and avoid under-prediction of exposure and potential effects (Annex O of Teck 2014). The EVWQP model dataset included all lotic and semi-lentic data available at that time and was derived to describe the overall pattern (in terms of mean predictions) and variability (in terms of residual scatter around the modelled mean) of bioaccumulation observed in the lotic and semi-lentic conditions that predominate in the Elk Valley. Thus, the EVWQP model provided an appropriate way to model exposure and evaluate potential effects at a regional scale for the purpose of establishing protective water quality targets.

As discussed in the next subsection, some of the variability on Figure 1 is associated with a subset of data in the upper-right quadrant of Figure 1 that exhibit distinctly higher bioaccumulation than other lotic sites. These apparently distinct sites are discussed in the next subsection.

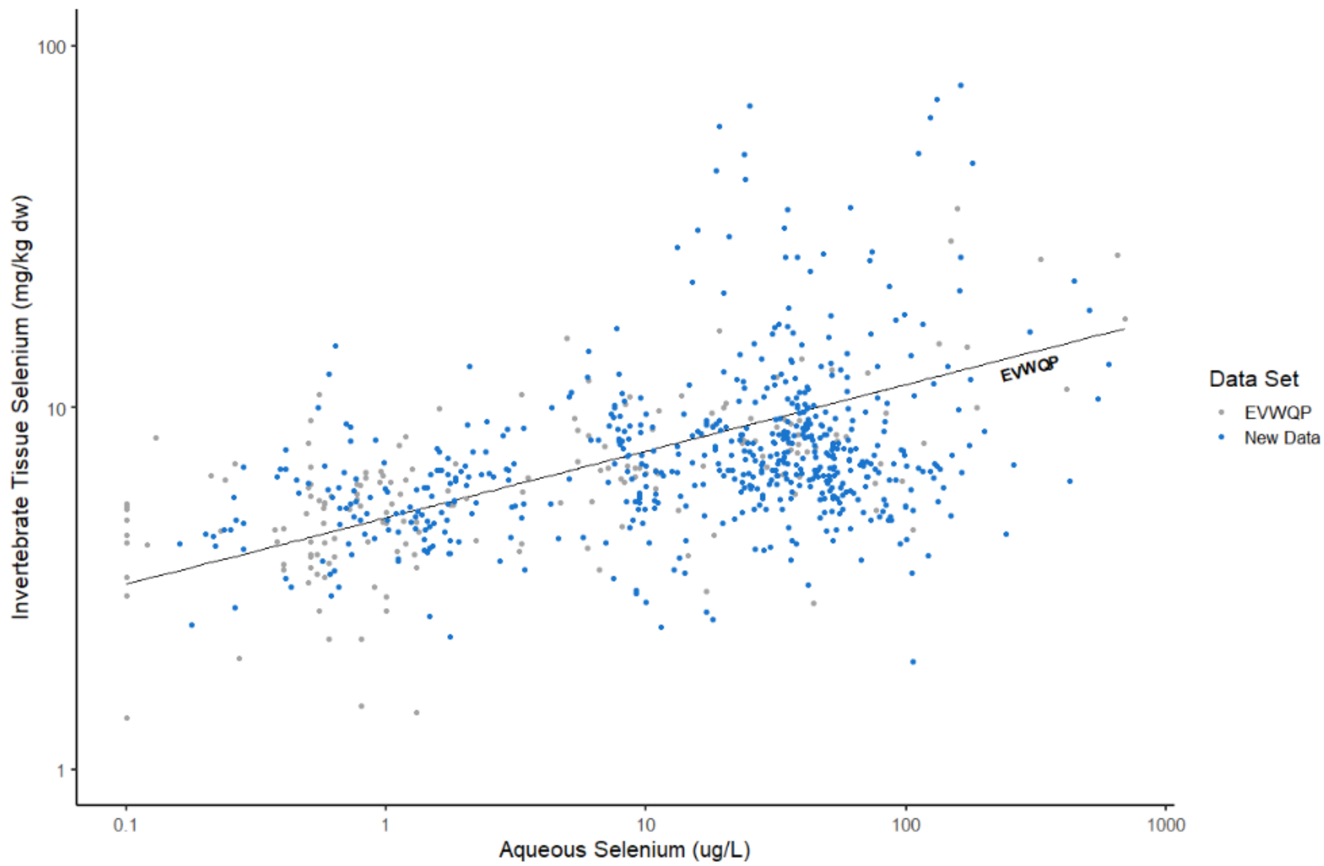

Figure 1: Comparison of original EVWQP lotic dataset and new lotic data to the original EVWQP model

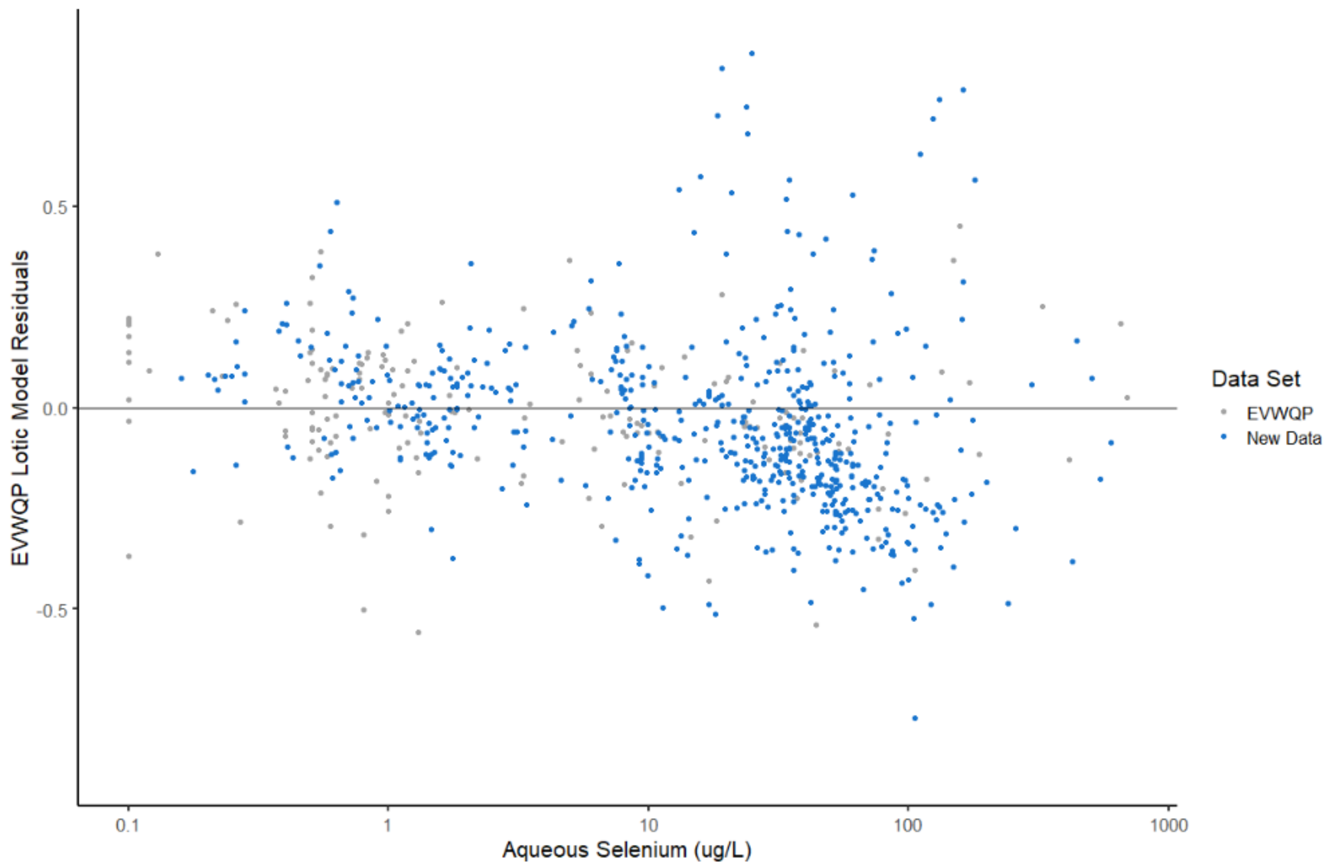

Figure 2: Residual plot for the full lotic dataset compared to predictions of the original EVWQP model

2.2.2 Evaluation of Sites with Atypical Selenium Bioaccumulation

Recent studies have identified changes to selenium speciation in lotic areas downstream of the West Line Creek Active Water Treatment Facility (AWTF) and immediately downstream of some sediment ponds (Golder 2018a). These areas occasionally or consistently have detectable concentrations of organoselenium species and higher concentrations of selenite than are observed in other areas of the Elk Valley.[1] As a result, some exhibit an atypical pattern of selenium bioaccumulation that is distinct from other lotic areas (

[1] Most areas of the Elk Valley exhibit selenium speciation dominated by selenate (usually >99%), with the remainder as selenite (usually <1%). Organoselenium species are rarely detected and when they occur tend to be present at concentrations ≤0.01 μg/L.

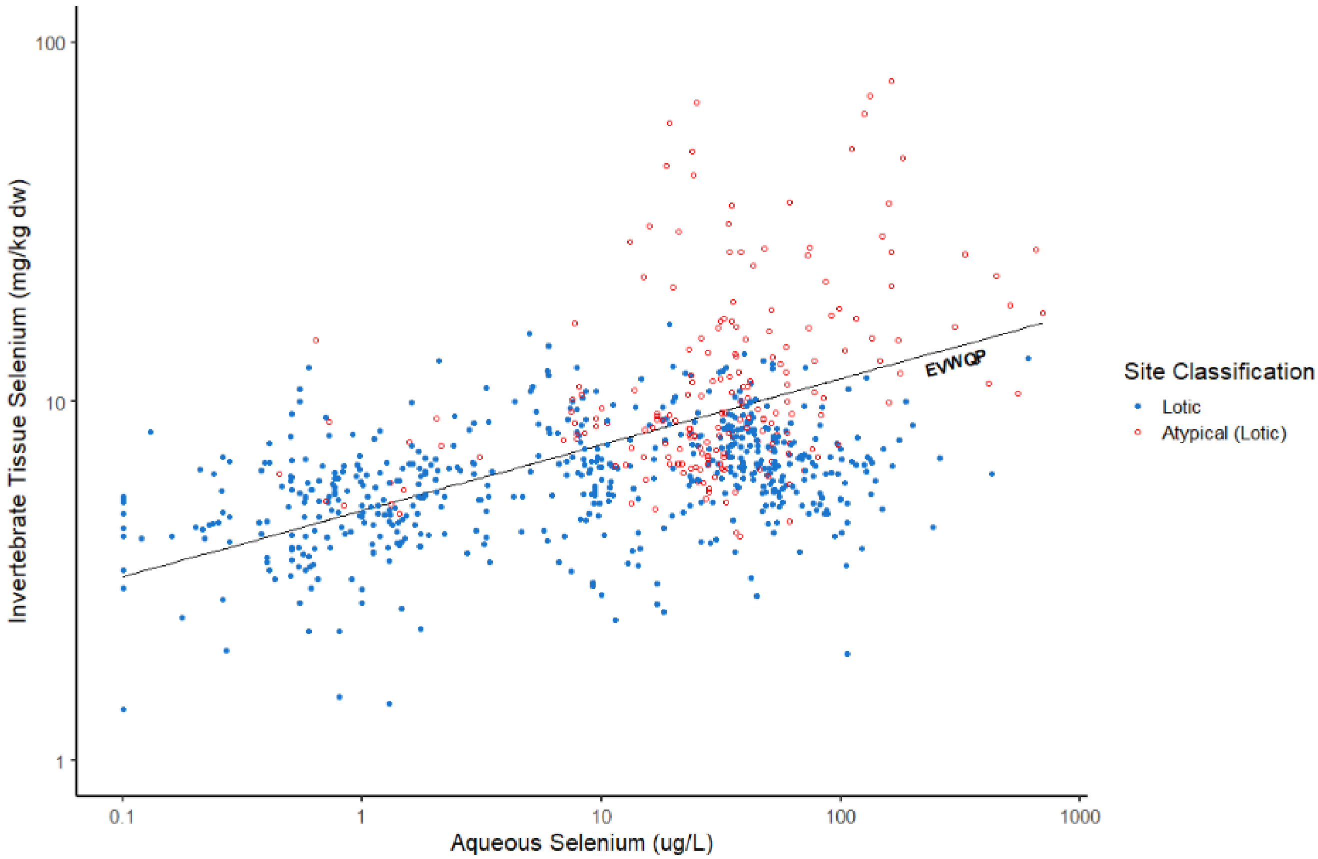

Figure 3). Teck has conducted targeted sampling of such sites to evaluate the spatial extent of this distinct pattern, investigate what factors may be causing the pattern, and support development of the speciation bioaccumulation tool (Golder 2018a). This targeted sampling has indicated that the atypical pattern appears to be highly localized, occurring immediately downstream of some (but not all) sediment ponds. Enhanced bioaccumulation in these areas has been attributed to the observed changes to selenium speciation, although Teck continues to investigate whether other mechanisms (e.g., the presence of certain taxa) may also be a factor at some locations.

Because areas with atypical speciation tend to fall on the higher end of the range of aqueous selenium concentrations (mostly >10 µg/L), these data produce the “flaring out” of the pattern depicted on Figure 1 and

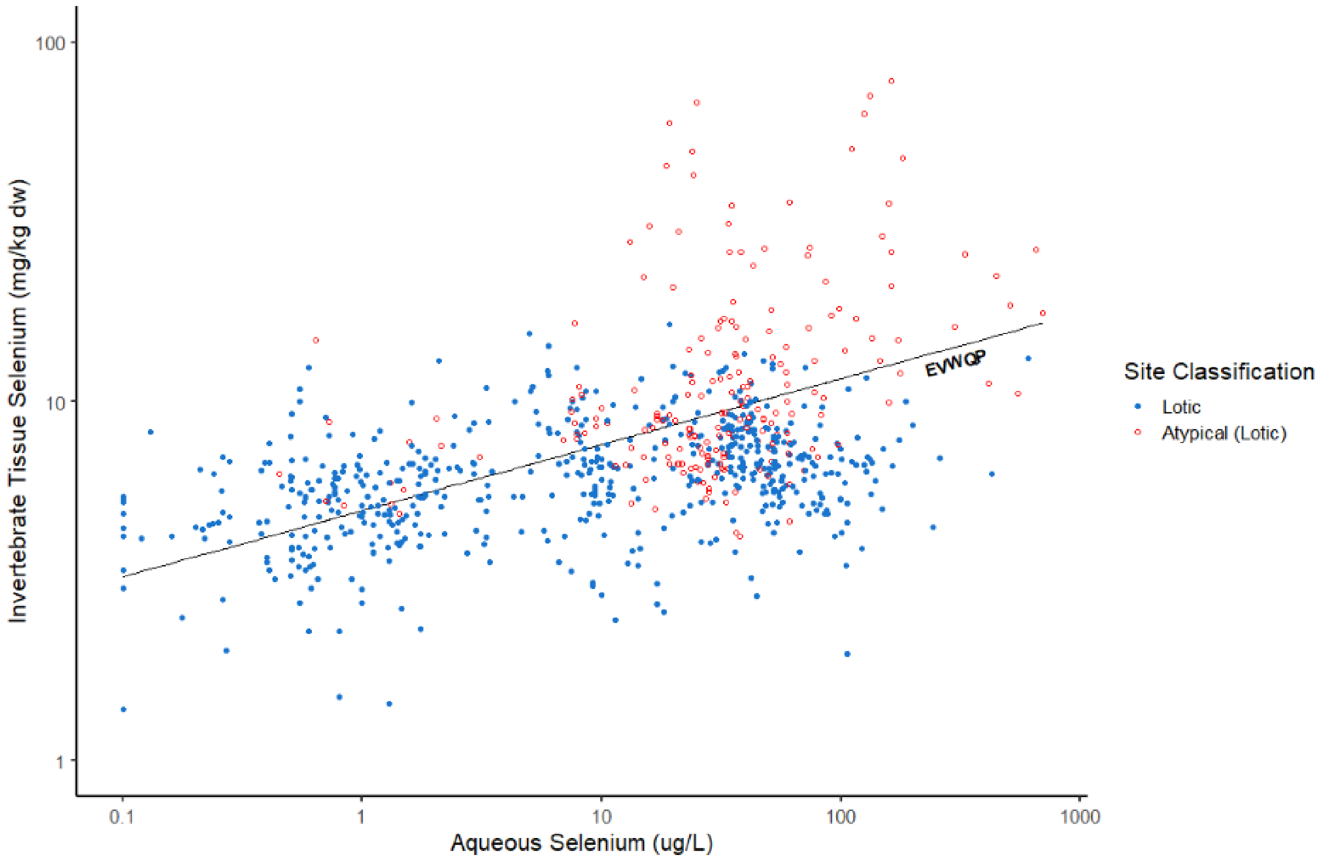

Figure 3. Inclusion of these data in the present model update would produce a steeper slope and wider residual scatter than is characteristic of the majority of lotic areas and would result in a model that does not effectively characterize the pattern of bioaccumulation in most lotic areas.

To avoid conflating different patterns of selenium bioaccumulation in different areas, sites at which atypical selenium bioaccumulation has been observed or has the potential to occur (Table 1) were excluded from the updated model. Thus, the updated lotic model will characterize the expected pattern of bioaccumulation at lotic sites with typical conditions (i.e., the pattern present at locations not immediately downstream of an AWTF or sediment pond), and will thereby provide a basis for testing whether a sampled area conforms to that expected pattern or exhibits a distinct pattern, potentially indicating that changes to speciation have occurred. Areas with confirmed atypical bioaccumulation conditions that are identified in this way will be evaluated using the speciation bioaccumulation tool (Golder 2018a).

Table 1: Monitoring Stations with Observed or Potential Atypical Selenium Bioaccumulation

Location	Monitoring Station
Bodie Creek	BOCK
Cataract Creek	CATCK
Clode Creek	CLODE
EVO Dry Creek	EV_DC1
LCO Dry Creek	LC_DC1, LC_DCDS, LC_DC2, LC_DC3, LC_DC4, LC_SPDC
Elk River Side Channel	ERSC2, ERSC4, ERSC5, SCDTC
Gate Creek	EV_GT1, GATE
Greenhills Creek	GHCKD
Harmer Creek	HACKDS, HACKOUT
Line Creek	LISP23, LISP24, LIDSL, LILC3, LI8, LIDCOM
Swift Creek	SW1, SWCK
Thompson Creek	THCK, THCK-R1, THCK-R4
Wolf Creek	GH_WOLF

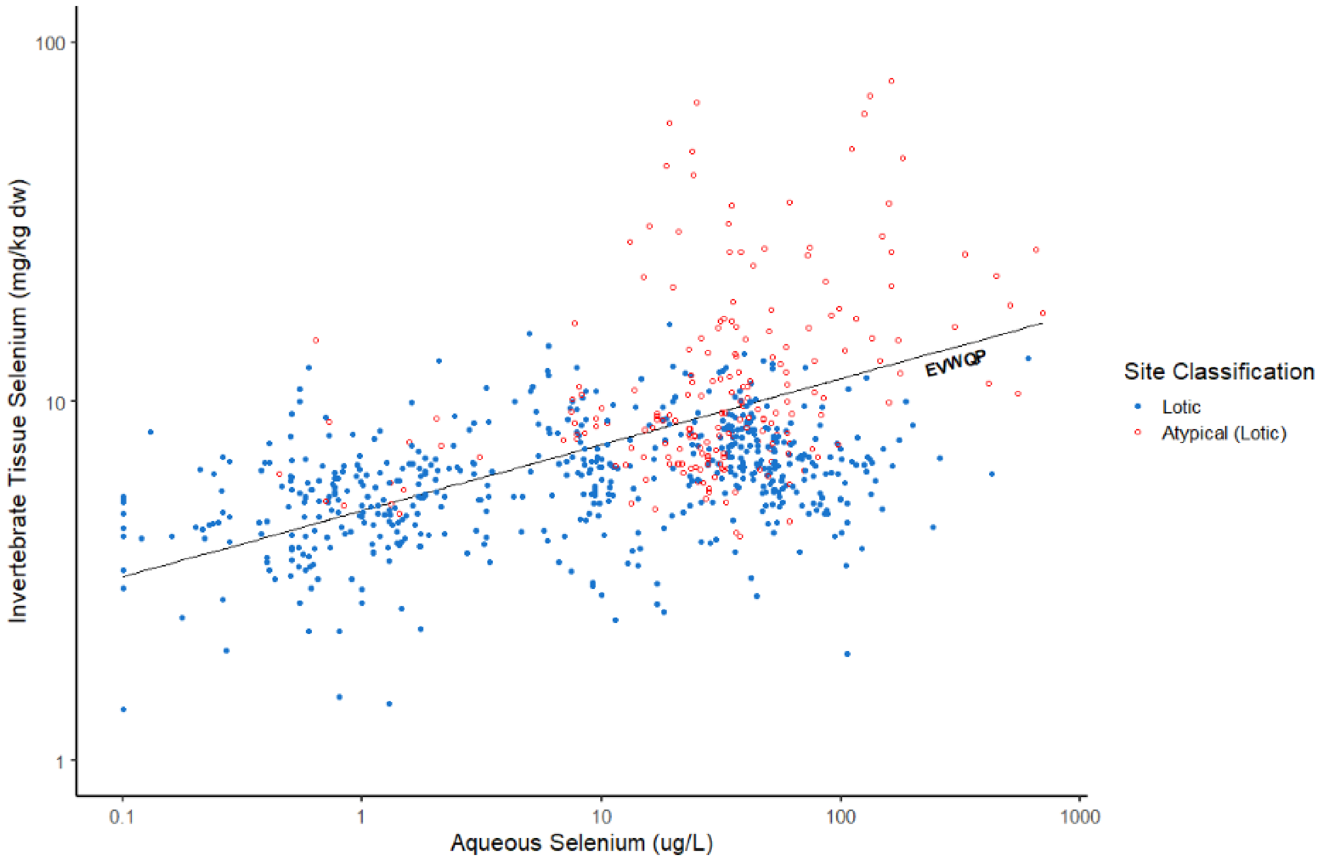

Figure 3: Comparison of paired aqueous and invertebrate selenium concentrations for lotic sites with observed or potential atypical selenium bioaccumulation (open circles) compared to other sites (filled circles)

2.2.3 Candidate Modelling Approaches

Following decisions made during the development of the EVWQP, models were fit by OLS regression of log-transformed data. Two approaches were evaluated in the process of updating the lotic bioaccumulation model:

- A candidate model was fit by log-linear regression of the updated dataset (as described in Sections 2.2.1 and 2.2.2) following methods described in the EVWQP.
- Additional candidate models were fit with log-transformed aqueous sulphate and selenium concentrations included as predictors. Sulphate was included either using a fixed slope of -0.322 based on analyses undertaken to update the speciation bioaccumulation tool (Golder 2020b, in prep.) or by simultaneously fitting slopes for both aqueous selenium and sulphate to the dataset included herein.

All analysis was performed in R version 3.6.1.

2.2.4 Model Evaluation Criteria

Candidate models were evaluated against the EVWQP model to identify the best-performing model based on the following criteria:

- **Structure of model residuals:** Residuals should be evenly distributed (symmetrical, approximately normal, and of constant magnitude across the range of values on a residual plot) and should display no apparent curvature or other structure. Uneven residuals can indicate a lack of robustness in estimated model coefficients and an elevated uncertainty in the true predictive power of the model. Structured residuals (i.e., residuals that exhibit an apparent pattern rather than being randomly scattered) indicate that important mechanisms may not be captured by the model, and consequently increase uncertainty in its true predictive power. Structured residuals indicate that alternative model forms should be evaluated.
- **Root mean squared error (RMSE)**: The RMSE characterizes the amount of residual scatter around the fitted model.
- **Model adjusted r^2**: The r^2 is a relative measure of model fit that compares the variation between the observed and predicted values to the variation between the individual observed values and the mean of the observed values. r^2 values can range from 0 to 1, with values closer to 1 indicating a better model fit that explains more of the variability in the predicted variable. The adjusted r^2 is a modified version of r^2 that has been adjusted for the number of predictors in the model. The adjusted r^2 increases only if the new term improves the model more than would be expected by chance and decreases when a predictor improves the model by less than expected by chance.
- **Akaike information criteria (AIC):** The Akaike information criterion (AIC) is a measure of the relative quality of a statistical model for a given set of data. AIC provides a means for model selection by characterizing the trade-off between goodness of fit and complexity of the model. Given a set of candidate models for a given dataset, the preferred model is the one with the lowest AIC value.

2.3 Lotic Model Selection

Table 2 provides model equations and evaluation criteria for the EVWQP model and candidate updated models. The results in Table 2 indicate that all three candidate updated models performed better than the EVWQP model for the updated dataset. One contributing factor to the improved performance over the EVWQP model is the exclusion of monitoring areas with known or potential atypical selenium bioaccumulation.

As in the EVWQP, residual scatter around the updated model was characterized by calculating RMSE. RMSE was calculated from sites included in model derivation, excluding the sites with observed or potential atypical bioaccumulation discussed in Section 2.2.2. The updated lotic model and associated RMSE therefore describe the expected pattern of bioaccumulation under typical lotic conditions. Bioaccumulation at lotic sites that conform to the modelled distribution would be consistent with expectations (per MQ5) for a typical lotic site.

Table 2: Candidate Lotic Model Summary and Selection Criteria

Candidate Model	Model Equation	*n*	RMSE	Adj. $r^{2(a)}$	AIC
EVWQP model (compared to original dataset)	$log_{10}[Se]_{inv} = 0.696 + 0.184 \times log_{10}[Se]_{aq}$	291[(b)]	0.220	0.36	-49.5
EVWQP model (compared to updated dataset)		565	0.188	-	-
Updated model excluding sulphate	$log_{10}[Se]_{inv} = 0.720 + 0.071 \times log_{10}[Se]_{aq}$	565	0.144	0.15	-578
Updated model including sulphate with fixed slope	$log_{10}[Se]_{inv} = 1.186 + 0.240 \times log_{10}[Se]_{aq} - 0.322 \times log_{10}[SO_4]_{aq}$	535	0.144	0.35	-553
Updated model including sulphate with fitted slope	$log_{10}[Se]_{inv} = 0.929 + 0.143 \times log_{10}[Se]_{aq} - 0.142 \times log_{10}[SO_4]_{aq}$	535	0.135	0.20	-620

Notes: "-" = not available; AIC = Akaike information criterion; *n* = number of data pairs included; RMSE = root-mean squared error; r^2 = coefficient of determination; $log_{10}[Se]_{inv}$ = log-transformed invertebrate tissue selenium concentration (mg/kg); $log_{10}[Se]_{aq}$= log-transformed aqueous selenium concentration (µg/L); $log_{10}[SO_4]_{aq}$= log-transformed aqueous sulphate concentration (mg/L)
(a) Values are adjusted r^2. Unadjusted multiple r^2 values were within 0.01 of the values shown.
(b) Of the 291 data pairs included in the original EVWQP model derivation, 184 were collected at sites characterized as lotic (included in this model update) and 107 were collected at sites characterized as semi-lentic (included in the lentic model update in Section 3).

Inspection of the residual plots for the four models (Figure 4) supports the interpretation that model performance is similar between the three candidate updated models and that all three updated models outperform the EVWQP model, particularly at the high end of modelled aqueous selenium concentrations.

Inclusion of sulphate as a predictor slightly improved model performance and reduced AIC relative to a model without sulphate, with an increase in adjusted r^2 from 0.15 to 0.20 and a slight decrease in RMSE (from 0.144 to 0.135) (Table 2). Inspection of model residuals (Figure 4) indicates that both candidate models perform similarly well for the majority of sites, with similarly distributed residuals. The updated model with a fitted sulphate slope was selected as the preferred candidate, but the updated model without sulphate would be expected to provide reasonable predictions if sulphate information is not available.

Figure 5 provides a comparison of updated lotic models[2] and the EVWQP model relative to the updated lotic dataset.

[2] For plotting vs. aqueous selenium concentration, the updated model with a fitted sulphate term (shown as the red line) was calculated from aqueous selenium and an associated mean sulphate concentration, which was estimated using an OLS regression of aqueous sulphate and selenium concentrations in the modelling dataset.

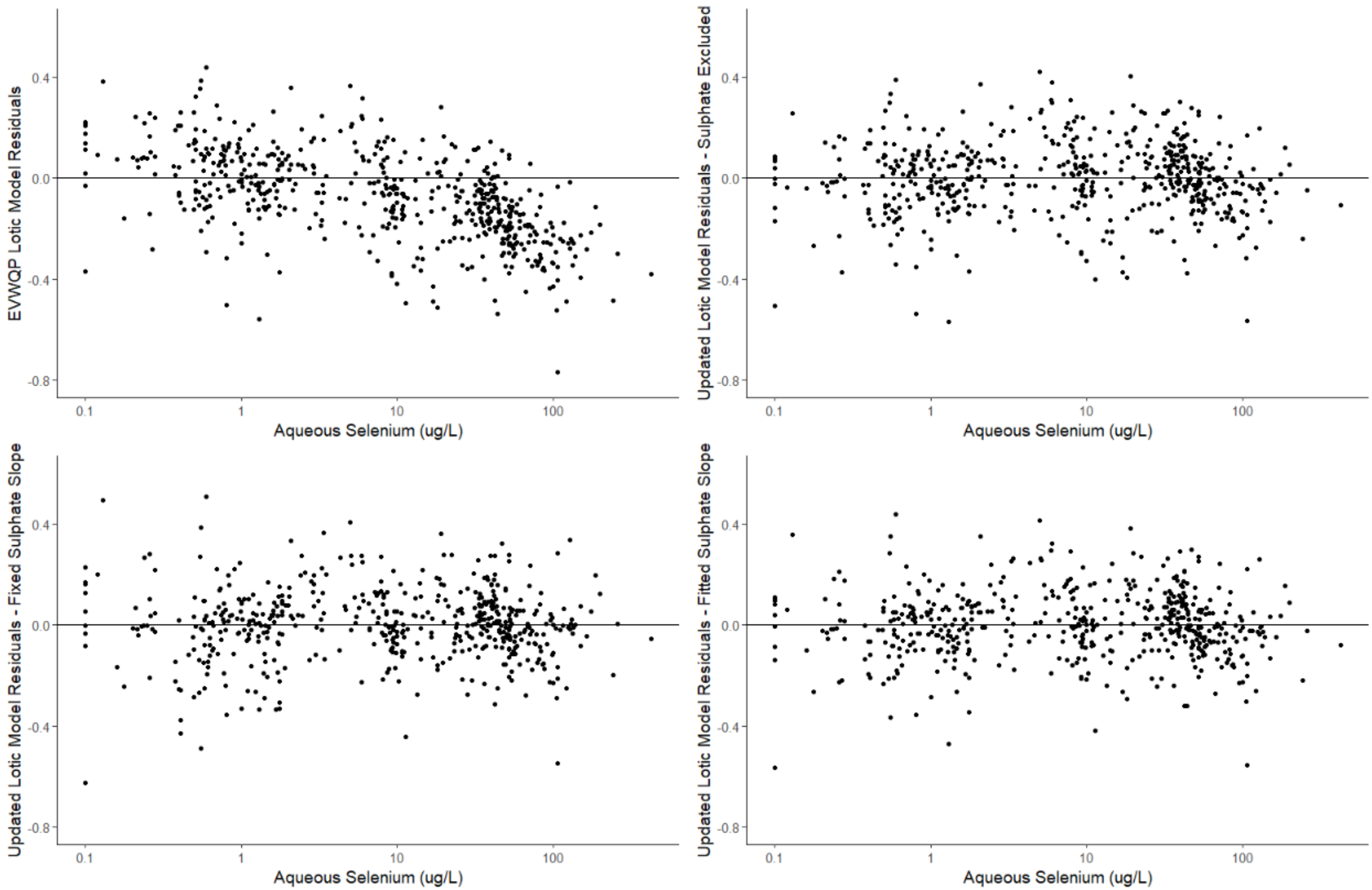

Figure 4: Model residuals for the four candidate lotic models outlined in Table 2

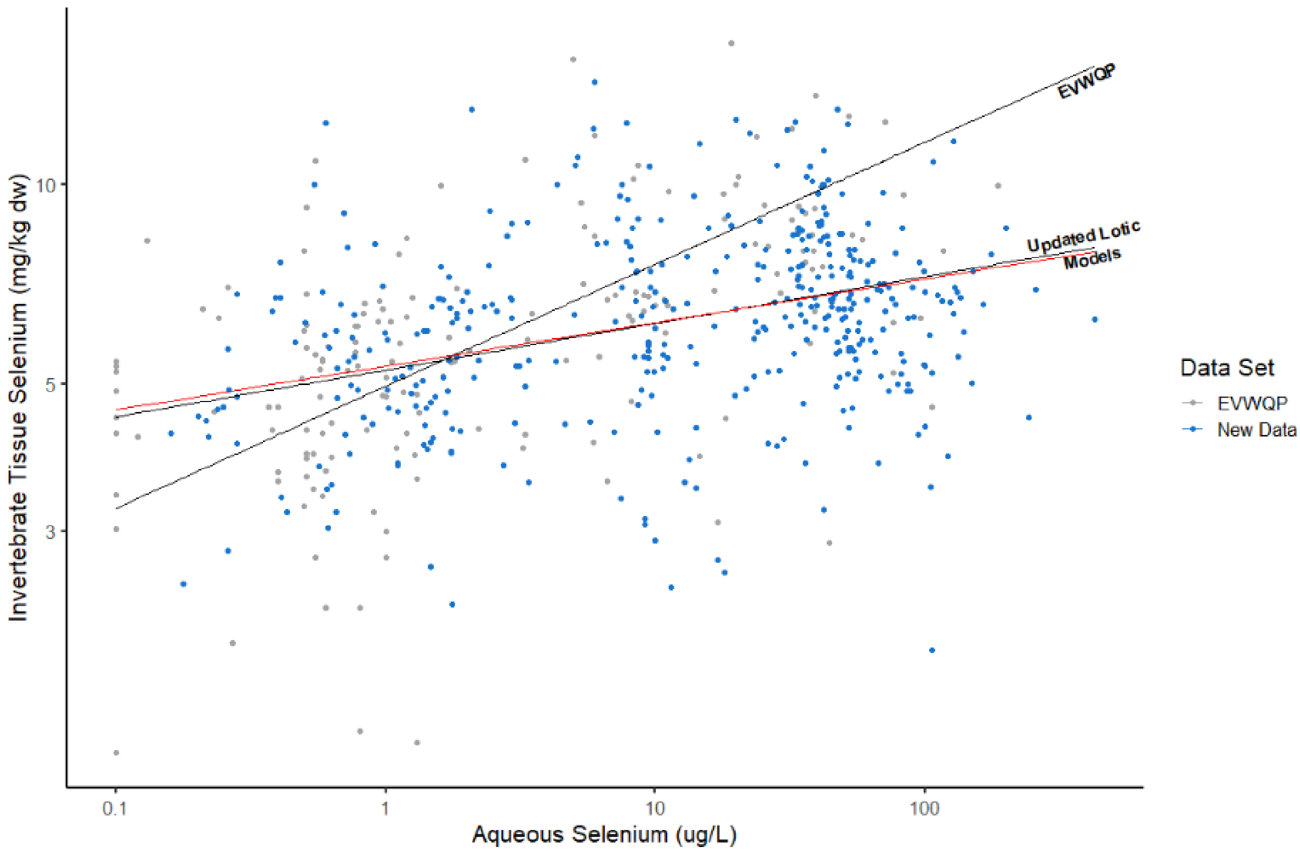

Figure 5: Comparison of updated lotic models without a sulphate term (black line labelled 'Updated Lotic Models') and with a fitted sulphate term (red line) to the existing EVWQP model

2.3.1 Uncertainty and Sensitivity Analysis for Key Assumptions

Key decisions made in the model selection process for the updated lotic model include the exclusion of sampling areas with known or suspected atypical selenium bioaccumulation, the inclusion or exclusion of aqueous sulphate as a predictor, and the exclusion of data points with reported invertebrate selenium concentrations ≤1 mg/kg.

As discussed in Section 2.2.2, exclusion of sites with atypical speciation was conducted to avoid conflating distinct patterns of bioaccumulation that reflect distinct underlying conditions and processes related to the relatively higher bioavailability of some organoselenium species relative to selenate. Inclusion of these data would result in a model that does not effectively characterize either pattern. Excluding these data provides a model that describes expected bioaccumulation under typical conditions of speciation, and thereby provides a basis for identifying sites that deviate from this expected pattern.

Inclusion or exclusion of sulphate as a predictor had relatively little effect on model performance, likely because aqueous selenium and sulphate concentrations tend to be highly correlated at most sites in the Elk Valley.

Including the two cases with invertebrate selenium concentrations ≤1 mg/kg dw (KICK on Kilmarnock Creek and FOUEW on the Fording River) would decrease the slope of the model from 0.071 to 0.065, which would result in poorer overall model diagnostics (RMSE=0.157; adj. r^2=0.11; AIC= -482; worse residual structure). The reason for the anomalous concentrations is unknown, but concentrations in other samples collected at the same locations on other sampling events (*n*=13) ranged from 4.6 to 8.3 mg/kg dw, indicating that the low values may be erroneous.

3.0 LENTIC MODEL UPDATES

3.1 Overview of RAEMP Lentic Model

A model describing selenium bioaccumulation in lentic areas in the Elk Valley was derived for the RAEMP and reported in Orr et al. (2012). Similar to the EVWQP model, the lentic model was derived using spatially and temporally paired aqueous and tissue chemistry data. Sites selected to characterize uptake of selenium from water in the lentic model included two lakes and a wetland in reference areas and a marsh, an oxbow, a pit lake, and a sediment pond in mine-influenced areas.

The lentic model was derived as a three-step model, with the first step representing uptake of aqueous selenium into the base of the food chain (referred to as biofilm and analogous to the water to periphyton transfer in the EVWQP model), the second step representing trophic transfer from biofilm to invertebrates, and the third step representing trophic transfer from benthic invertebrates to westslope cutthroat trout. The dataset used to derive the lentic model included data collected from lentic sites in the Elk Valley between 1996 and 2009, and models were generated using linear regression on both non-transformed and log-transformed datasets for each step in the three-step model. At each step, the model with the higher r^2 of the non-transformed and log-transformed approaches was selected. Additional detail on the derivation of the lentic model is provided in Orr et al. (2012).

Step 1 of the lentic model was derived based on a linear relationship between aqueous selenium concentration (in mg/L) and the concentration of selenium in biofilm (in mg/kg dw):

$$[Se]_{Biofilm} = 1225.2[Se]_{aq} + 0.676 \qquad (2)$$

Equation 2 (r^2=0.98) was derived from 14 data pairs collected at 7 sites with aqueous selenium concentrations ranging from 0.2 to 64.9 µg/L.

Step 2 of the lentic model was derived based on a log-linear relationship between the concentrations of selenium in biofilm and invertebrate tissue (in mg/kg dry weight):

$$log_{10}[Se]_{inv} = 0.517log_{10}[Se]_{biofilm} + 0.717 \qquad (3)$$

Equation 3 (r^2=0.80) was derived from 10 data pairs collected at 7 sites with biofilm selenium concentrations ranging from 0.96 to 83.6 mg/kg dw.

Combining Equations 2 and 3 gives Equation 4, which describes the relationship between aqueous selenium concentrations (in mg/L) and invertebrate tissue concentrations (in mg/kg dw):

$$log_{10}[Se]_{inv} = 0.517log_{10}(1225.2[Se]_{aq} + 0.676) + 0.717 \qquad (4)$$

3.2 Approach to Updating the Lentic Model

The approach to updating the lentic model was to incorporate new data into the lentic dataset (Section 3.2.1), focus on sites that characterize the typical pattern of enhanced lentic-type bioaccumulation (Section 3.2.2), and then derive and evaluate a set of candidate updated models (Section 3.2.3).

3.2.1 Updates to Selenium Dataset and Evaluation of Existing Model

The dataset used to derive the RAEMP lentic bioaccumulation model did not include paired invertebrate tissue and aqueous selenium concentration data, since the relationship between aqueous selenium concentrations and invertebrate tissue selenium concentrations was characterized using biofilm selenium concentrations as an intermediate step. For the present update, paired aqueous selenium and invertebrate tissue selenium data for lentic sites were compiled. The compilation included sites that were identified as semi-lentic (*n*=107) and lentic (*n*=8) under the EVWQP and incorporated data from the Golder (2018b) update (*n*=67) and sampling programs conducted in the Elk Valley since the most recent update (*n*=141). New data that were incorporated into the dataset for the updated lentic model included:

- 2020 Lentic Area Supporting Study report (In progress; to be appended to the Minnow (2020, in prep.) RAEMP 2017-2019 report).
- Paired invertebrate tissue and water chemistry data provided by Minnow in a compiled Excel file for 2012 – 2019.

In total, the compiled dataset consisted of 323 data points collected from 2006 to 2019 in lentic and semi-lentic habitats throughout the Elk Valley. Following decisions made during the EVWQP, samples with invertebrate selenium concentrations ≤1 mg/kg were identified as biologically unrealistic and potentially erroneous and were excluded from model derivation; eight samples were excluded for this reason, six of which were collected at Grave Lake Marsh. The compiled lentic dataset is provided in Attachment A.

Sulphate was not expected to be a successful predictor because bioaccumulation in lentic areas is expected to be most strongly dependent on organoselenium, the uptake of which is not affected by sulphate. However, for comparison to the lotic analysis in Section 2.2.3, concurrent and co-located aqueous sulphate data were compiled following the pairing rules outlined in Annex E of the EVWQP (Teck 2014). Paired sulphate data were available for 307 of 323 data points.

As discussed in Section 3.1, the updated dataset of lentic sites included a wider range of types of habitats than was included in the Orr et al. (2012) analysis, with varying characteristics and varying degrees of selenium bioaccumulation. In particular, the 2013 field study sampled seasonal side channels, oxbows, backwater channels, natural and constructed ponds, wetlands, and beaver impoundments. Other lentic monitoring programs have also sampled a combination of natural lakes, ponds, oxbows, and wetlands, as well as actively managed and fallow (naturalized) sediment ponds. Selenium data from these sites indicate a wide range of bioaccumulation, with some sites exhibiting selenium concentrations in biota consistent with the lotic pattern described in Section 2 and other sites conforming closely to the Orr et al. (2012) lentic model.

Comparison of paired aqueous and invertebrate tissue selenium data for sites characterized as semi-lentic during development of the EVWQP and all other available lentic data (Figure 6) supports the observation that sites classified as semi-lentic tend to exhibit a lower degree of selenium bioaccumulation than sites with a higher degree of lentic character. Inspection of the residual plot for the full lentic dataset compared to the existing RAEMP lentic model (Figure 7) indicates that model residuals form a curved structure and that invertebrate selenium concentrations at high (>10 µg/L) and low (<1 µg/L) aqueous selenium concentrations tend to be overpredicted by the model. It was expected that some variation in selenium bioaccumulation could be explained by identifying habitat criteria that describe conditions under which enhanced bioaccumulation is more likely to occur. Evaluation of prospective habitat criteria associated with enhanced bioaccumulation in lentic habitats is described in the following subsection.

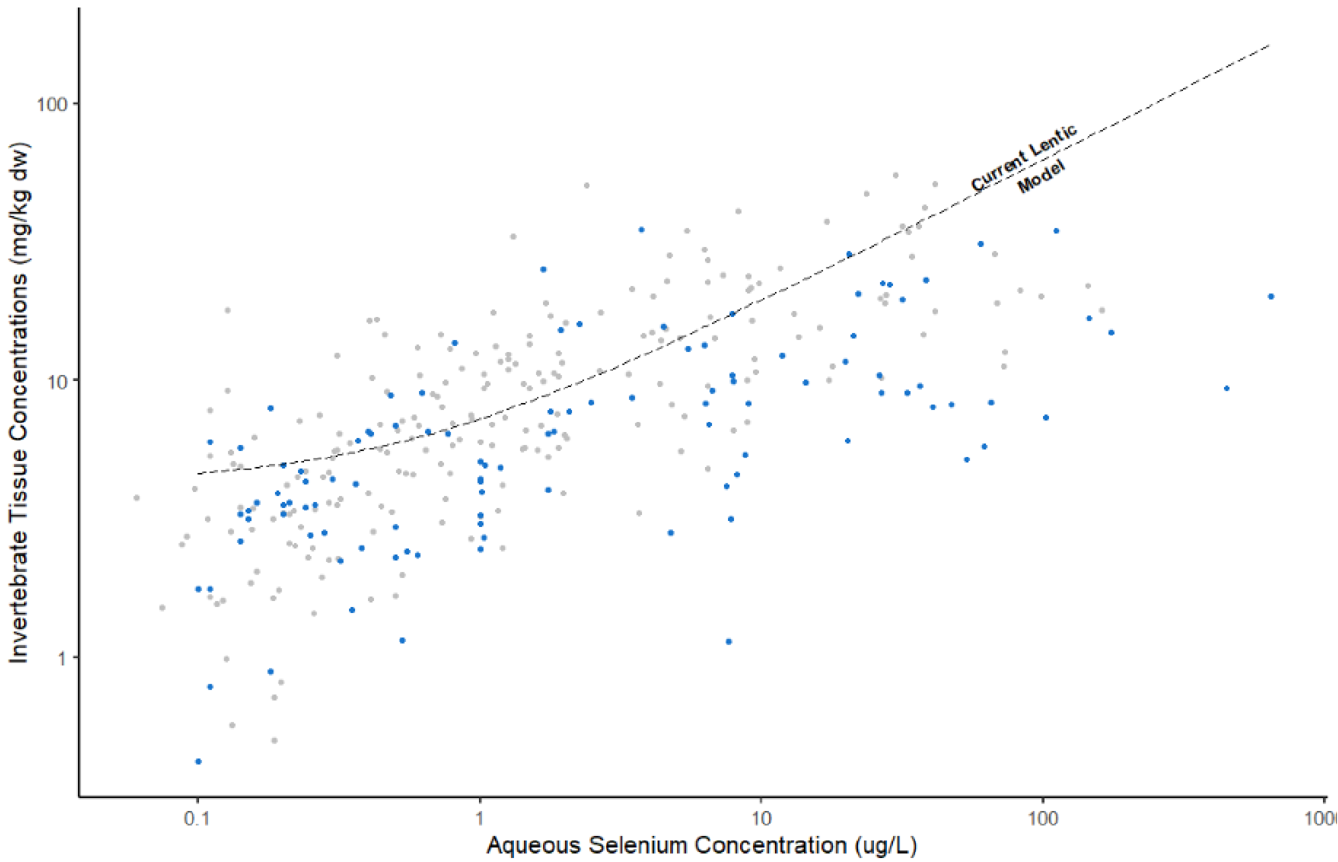

Figure 6: Comparison of data for semi-lentic sites from the EVWQP (blue dots) and all other lentic data (grey dots) to the existing RAEMP lentic model

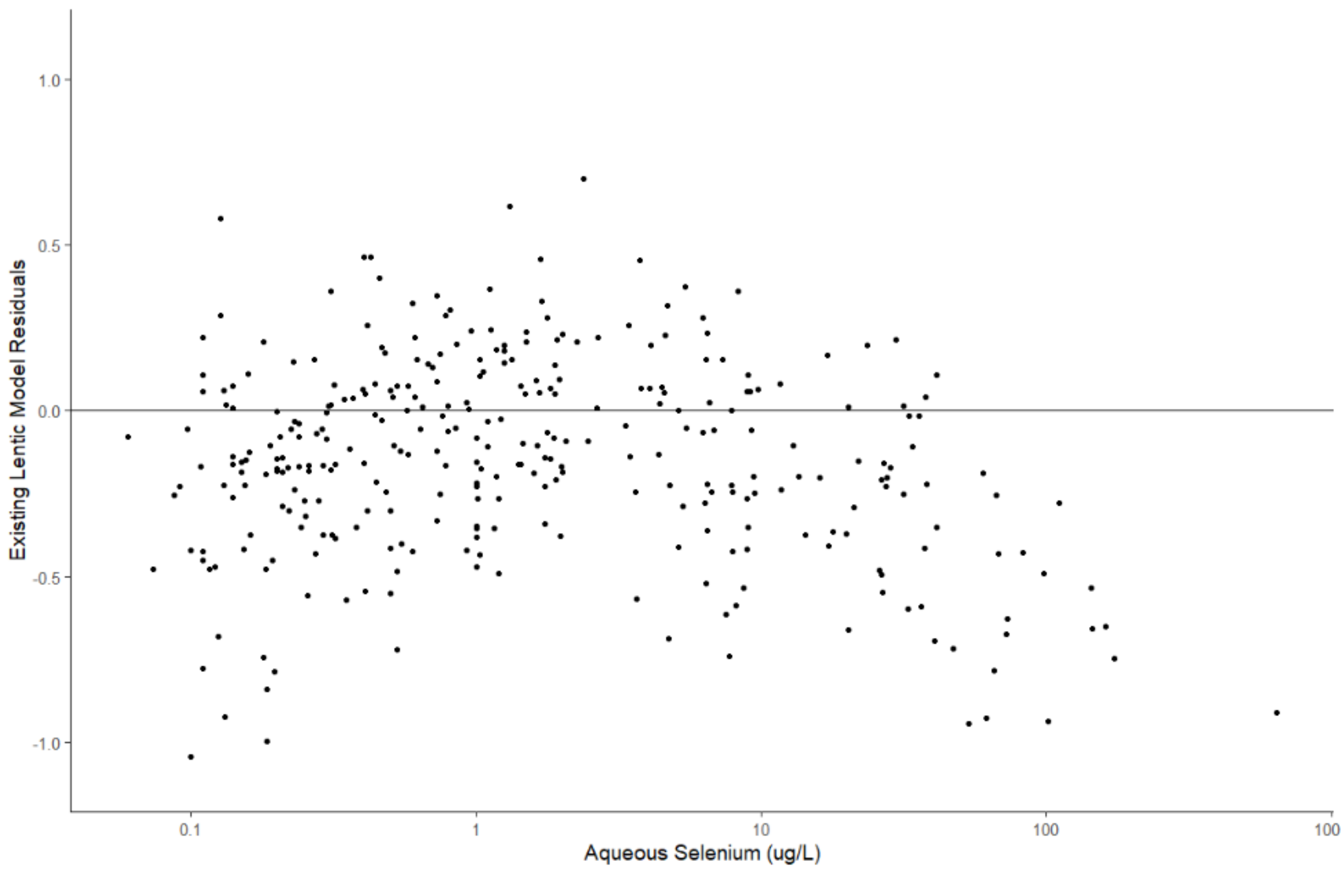

Figure 7: RAEMP lentic model residuals for the full updated lentic dataset

3.2.2 Development of Lentic Criteria

Available habitat information was compiled to support the development of criteria to identify sites expected to exhibit the distinct pattern of enhanced lentic-type bioaccumulation. The analysis presented herein will be revisited as more information becomes available and may in future include other diagnostic parameters.

Habitat characteristics were selected for inclusion in the analysis based on Buffagni et al. (2010) and preliminary work by de Bruyn et al. (2014), including, where available:

- Chemistry: Oxidation-reduction potential (ORP), dissolved oxygen (DO), and total organic carbon (TOC) in sediment and water.
- Habitat characteristics: flow, substrate composition, depth (maximum and mean), aquatic vegetation coverage (total, submergent, emergent, dominant species).

Habitat information was compiled from report tables, field notes, and field photos. Qualitative, semi-quantitative, and quantitative habitat data from different sources were combined by assigning categories as outlined in Table 3.

Table 3: Categories for Lentic Habitat Characteristics

Category	Flow	Substrate	Maximum Depth (cm)	Vegetation
4	Nil (no visible flow, no signs of fluctuation or flow such as undercut banks); inferred residence time years; large lake or stagnant pond	Organic	>300	76–100% (abundant)
3	Trace (no visible flow but evidence of inflow or outflow); inferred residence time >6 months	Silt/sand + organic	200–300	51–75% (moderate)
2	Very slow or no/trace but evidence of seasonal flushing; inferred residence time <6 months	Silt/sand	100–200	26–50% (sparse to moderate)
1	Slow (visible flow); inferred residence time <<6 months	Fines to coarse sand	50–100	1–25% (sparse)
0	Lotic	Coarse sand, cobble	<50	0% (absent)

Note: Categories were assigned independently for each characteristic; a given sampling location could be assigned a different category for each of flow, substrate, depth, and vegetation cover.

The analysis to identify lentic criteria focused on data from sites with aqueous selenium concentrations >1 µg/L because this is approximately the concentration at which lentic and lotic patterns of bioaccumulation consistently diverge (Orr et al. 2012; Teck 2014). At aqueous selenium concentrations <1 µg/L, both lentic and lotic sites can have relatively large positive residuals, whereas at >1 µg/L relatively large positive residuals would more likely indicate a lentic-type pattern of bioaccumulation. The analysis focused on natural and naturalized lentic areas, including fallow sediment ponds (Harmer Sediment Pond) and pit lakes (Henretta Pit Lake) but excluding actively maintained mine sediment ponds.

The relative degree of lentic character evident in bioaccumulation data from each site was initially characterized using the residuals of a relationship between benthic invertebrate and aqueous selenium concentrations. This approach accounted for the effect of aqueous selenium concentration on benthic invertebrate selenium concentration. An OLS log-linear regression model was fit to the full updated lentic dataset described in Section 3.2.1. Residuals for each case were classified as positive (and assigned a score of 1) or negative (and assigned a score of 0). The residual categories were then used as the dependent variable in a stepwise logistic regression analysis using the available habitat information outlined in Section 3.2.1. Logistic regression is a statistical model that uses a logistic function to model a binary dependent variable, identifying independent variables that are able to predict which level the binary dependent variable will have (in this case, whether a site will have positive or negative residuals). The stepwise logistic regression analysis was performed using the stepAIC() function in the MASS package of R version 3.6.1. The stepAIC() function uses the AIC to select the best performing model from all possible combinations of predictor variables.

The stepwise logistic regression analysis selected a model that included aquatic vegetation coverage and aqueous TOC as predictors of positive residuals. Specifically, the analysis identified a significant positive effect of aquatic vegetation coverage category 4 (p=0.0142) on the likelihood that the residual would be positive and a significant (p=0.010) positive effect of increasing aqueous TOC concentrations. The analysis also identified a positive but non-significant effect of aquatic vegetation coverage category 3 (p=0.15).

Following the stepwise logistic regression analysis, relationships between habitat characteristics and model residuals were further explored by inspection of violin plots of the distribution of residuals for categorical variables and scatterplots for continuous habitat variables. Representative violin plots are provided in Figure 8 and Figure 9 for habitat characteristics that discriminated between positive and negative residuals. Violin plots (for categorical variables) and scatter plots (for continuous variables) are provided in Attachment B for habitat characteristics that did not discriminate between positive and negative residuals.

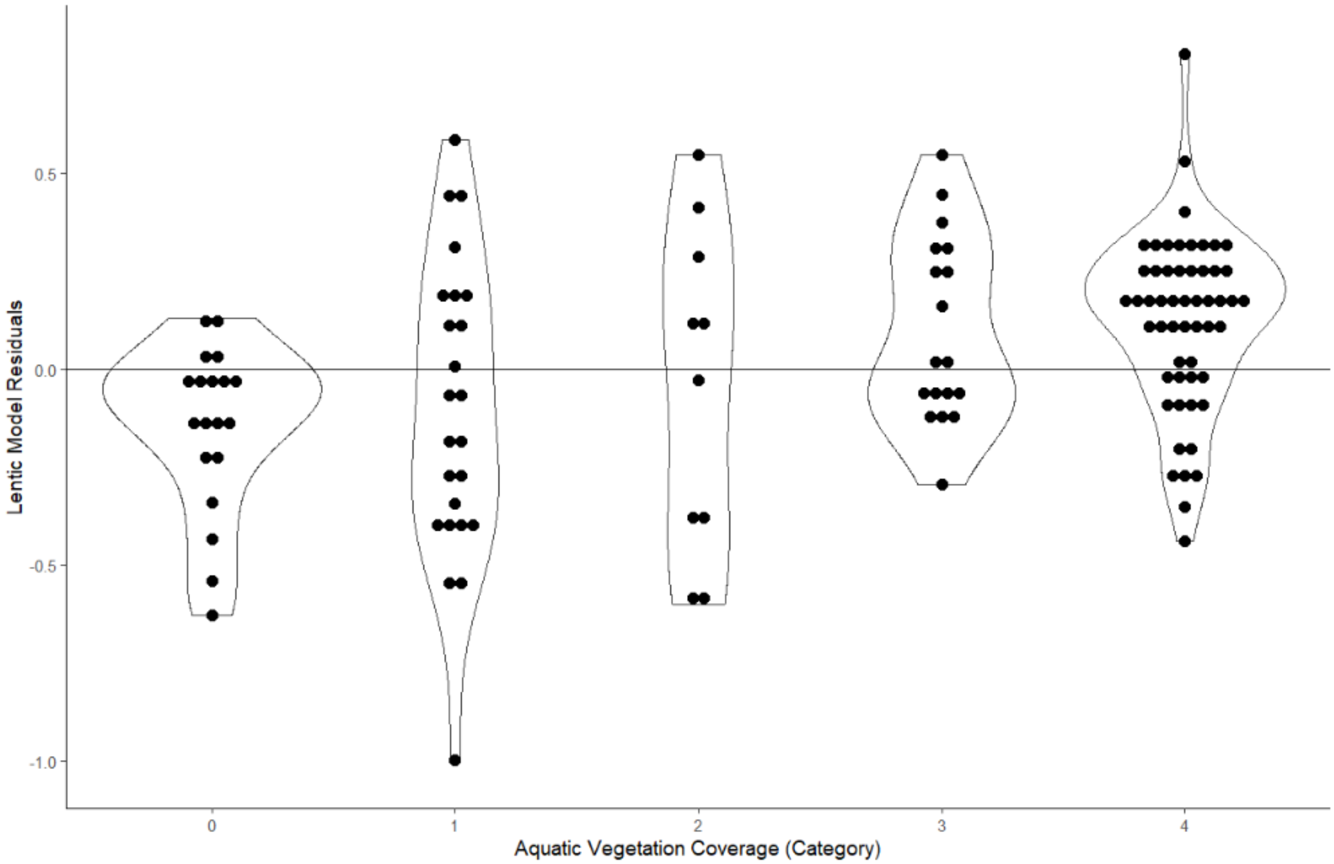

Figure 8: Violin plot of the distribution of model residuals for an OLS regression derived using the full lentic dataset for each category of aquatic vegetation cover per Table 3

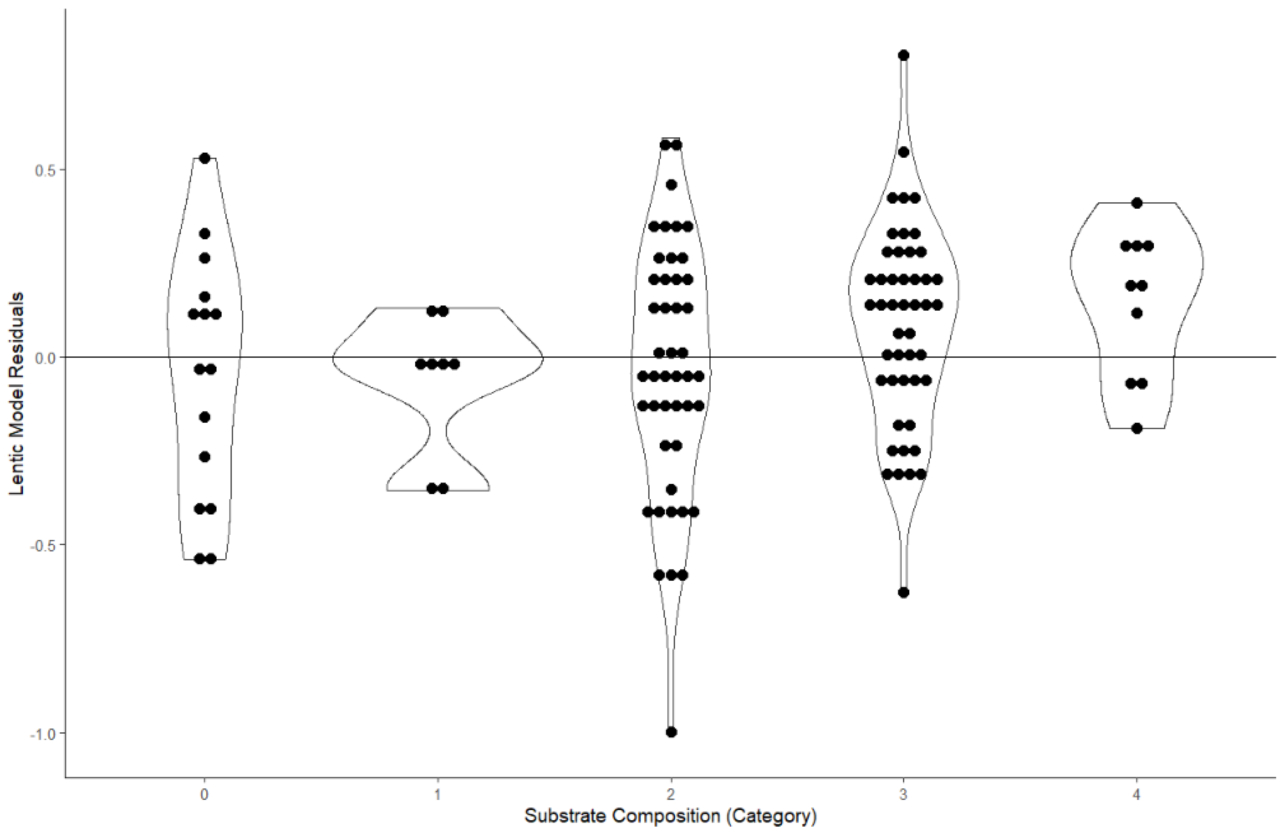

Figure 9: Violin plot of the distribution of model residuals for an OLS regression derived using the full lentic dataset for each category of substrate composition per Table 3

Based on the combination of inspection of plots and the stepwise logistic regression approach, the following provisional lentic criteria were selected:

- Aquatic vegetation coverage >50% (vegetation coverage categories 3 and 4), also referred to in some reports as “abundant”, “moderate”, or “common”. The distribution of model residuals by category (Figure 8) indicates that at higher aquatic vegetation coverage (i.e., categories 3 and 4), model residuals were typically positive and there was an increasing trend in the average model residual with increasing vegetation cover.
- Substrate predominately comprised of organic material (substrate category 4), including sites where the substrate was described as organic and sites with estimated percent organic matter ≥60%. Although substrate composition was not identified as a descriptive variable during the stepwise logistic regression approach, visual inspection of the distribution of model residuals by category (Figure 9) indicates that for higher categories (i.e., higher proportion of organic material), model residuals tend to be positive more often than negative. Model residuals for samples collected from sites with substrate composition category 4 were either near or above zero in all cases.
- TOC was not retained as a criterion because it was almost entirely redundant with the other two criteria. Positive residuals tended to occur at TOC concentrations greater than ~3 mg/L. Of the 29 sites with TOC >3 mg/L, 23 also met one or both of the above criteria. The remaining sites were split between positive residuals (*n*=4) and negative residuals (*n*=2), indicating no additional discriminatory power of TOC as a criterion.

Figure 10 shows that, as intended, data from sites that met the provisional lentic criteria (blue circles) most often had positive residuals (falling above the line), whereas sites that did not meet the criteria (black circles) most often had negative residuals (falling below the line). Data are also plotted in grey for sites with insufficient habitat data and/or aqueous selenium concentrations <1 µg/L.

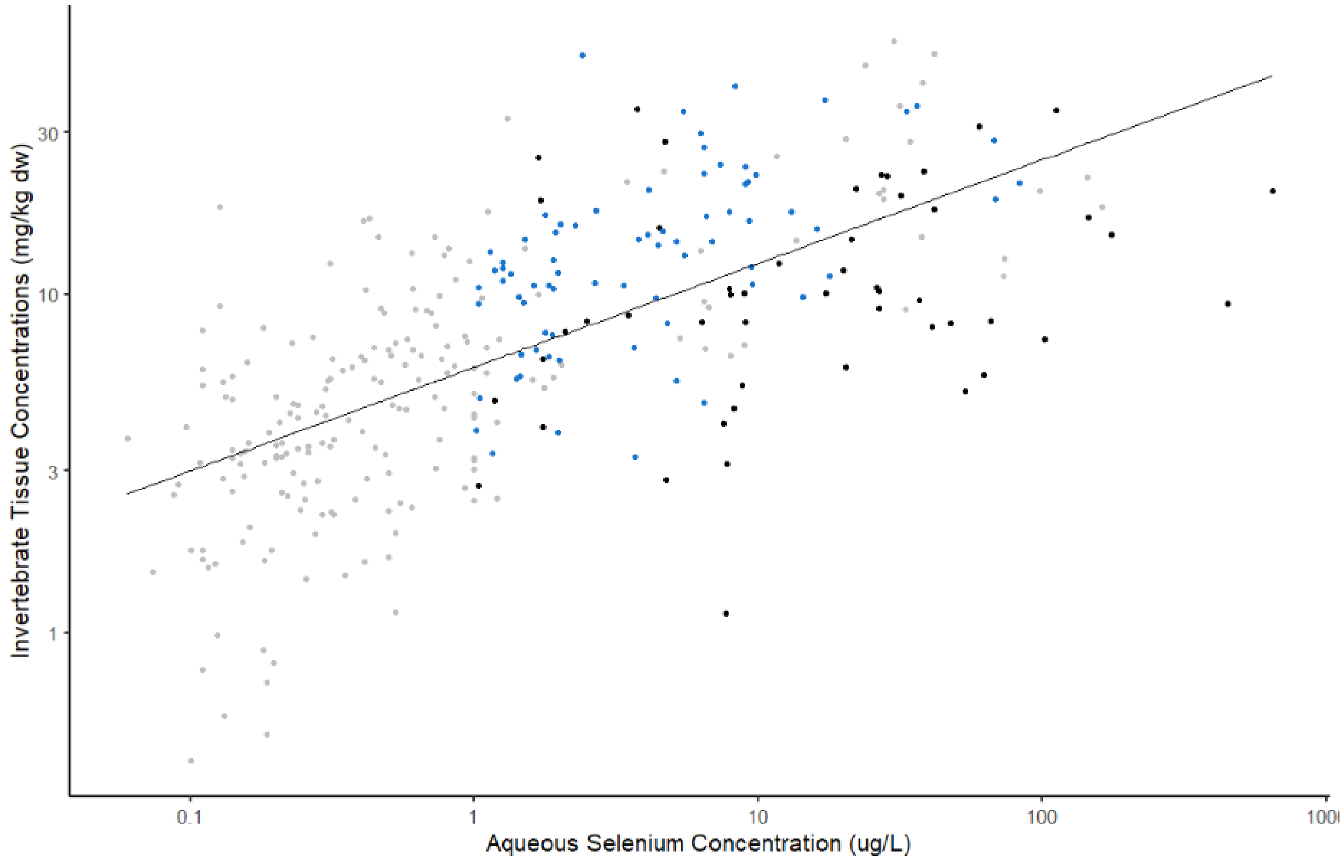

Figure 10: Comparison of bioaccumulation at sites meeting (blue circles) and not meeting (black circles) provisional lentic criteria relative to an OLS regression fit through the full dataset; sites not included in the analysis are shown in grey

3.2.3 Candidate Modelling Approaches

Consistent with the approach described for lotic models in Section 2.2.3, lentic models were fit by OLS regression of log-transformed data. Only data meeting the provisional criteria in Section 3.2.2 were included in the following analysis. Two approaches were evaluated in the process of updating the lentic bioaccumulation model:

- A candidate model was fit by log-linear regression of the updated dataset (as described in Sections 3.2.1 and 3.2.2) using methods following those described in the EVWQP.
- Additional candidate models were fit with log-transformed aqueous sulphate and selenium concentrations included as predictors. Sulphate was included either using a fixed slope of -0.322 based on analyses undertaken to update the speciation bioaccumulation tool (Golder 2020b, in prep.) or by fitting a sulphate slope to the dataset included herein.

All analysis was performed in R version 3.6.1. Candidate models were evaluated as described in Section 2.2.4.

3.3 Lentic Model Selection

Table 4 provides model equations and evaluation criteria for the Orr et al. (2012) model and candidate updated models. The results in Table 4 and residual plots in Figure 11 indicate that, as expected, inclusion of sulphate did not improve model performance. A fixed sulphate slope resulted in poorer fit and more structured residuals than the Orr et al. (2012) model. A fitted sulphate slope resulted in a small improvement over the Orr et al. (2012) model but the fitted slope was positive, which does not align with the role of sulphate as an inhibitor of selenium uptake and may be an artifact of the underlying sulphate-selenium correlation. The updated log-linear fit without sulphate had lower RMSE and improved residuals compared to the Orr et al. (2012) model and was derived from a much larger dataset, and was therefore selected as the preferred model. Figure 12: Comparison of the updated lentic model to the Orr et al. (2012) lentic model provides a comparison of the updated and Orr et al. (2012) lentic models.

RMSE for the selected updated model was calculated in two ways:

- RMSE was first calculated from sites that met the lentic criteria and were included in model derivation. This RMSE describes the distribution of expected bioaccumulation under “fully lentic” conditions. Bioaccumulation at lentic sites that conforms to this modelled distribution would be consistent with expectations (per MQ5) for a fully lentic site. Semi-lentic sites would not be expected to conform to this modelled distribution.
- An alternative RMSE was then calculated from all lentic (included in model derivation) and semi-lentic (not included in model derivation) sites. This alternative RMSE describes the distribution of bioaccumulation under the range of lentic and semi-lentic conditions that occur in the Elk Valley. This alternative RMSE will allow predictions of a distribution of bioaccumulation across a combination of lentic and semi-lentic sites, similar to the way the EVWQP model allows predictions of a distribution of bioaccumulation across a combination of lotic and semi-lentic sites (as discussed in Section 2.1). Because residual scatter for the combined dataset was asymmetrical, separate RMSE values were calculated for positive and negative residuals.

The approach to calculating RMSE described in the bullets above will support the same predictive analysis developed for the EVWQP (i.e., predicting the distribution of bioaccumulation at lentic, semi-lentic, and lotic sites) but is better suited to also support the interpretive analysis conducted in the RAEMP (i.e., detecting when observed conditions in lentic and lotic sites deviate from expected conditions). Considering semi-lentic sites in conjunction with the lentic model (the approach herein) rather than the lotic model (the EVWQP approach) will also simplify updating predictive approaches as understanding of lentic vs. semi-lentic bioaccumulation improves.

Table 4: Candidate Lentic Model Summary and Selection Criteria

Candidate Model	Model Equation	*n*	RMSE	Adj. r^2	AIC
RAEMP model (compared to updated dataset)	$log_{10}[Se]_{inv} = 0.517 log_{10}(1225.2[Se]_{aq} + 0.676) + 0.717$	174	0.255	-[(a)]	-[(a)]
Updated model excluding sulphate	$log_{10}[Se]_{inv} = 0.847 + 0.397 \times log_{10}[Se]_{aq}$	174	0.235[(b)]	0.56	-4.6
Updated model including sulphate with a fixed slope	$log_{10}[Se]_{inv} = 1.298 + 0.598 \times log_{10}[Se]_{aq} - 0.322 \times log_{10}[SO_4]_{aq}$	172	0.325	0.49	107.7
Updated model including sulphate with a fitted slope	$log_{10}[Se]_{inv} = 0.717 + 0.335 \times log_{10}[Se]_{aq} + 0.094 \times log_{10}[SO_4]_{aq}$	172	0.230	0.57	-10.0

Notes: "-" = not available; AIC = Akaike information criterion; n = number of data points included; RMSE = root-mean squared error; r^2 = coefficient of determination; $log_{10}[Se]_{inv}$ = log-transformed invertebrate tissue selenium concentration (mg/kg); $log_{10}[Se]_{aq}$= log-transformed aqueous selenium concentration (mg/L in RAEMP model; µg/L in updated models); $log_{10}[SO_4]_{aq}$= log-transformed aqueous sulphate concentration (mg/L)

[(a)]The original RAEMP lentic model involved a two-step process to describe the relationship between aqueous selenium concentrations and invertebrate tissue concentrations. Therefore, model diagnostics were not directly comparable to the candidate updated models.

[(b)]Residual scatter for a dataset including both lentic and semi-lentic sites was asymmetrical, with RMSE=0.236 for positive residuals and RMSE=0.350 for negative residuals. See text in Section 3.3 for details.

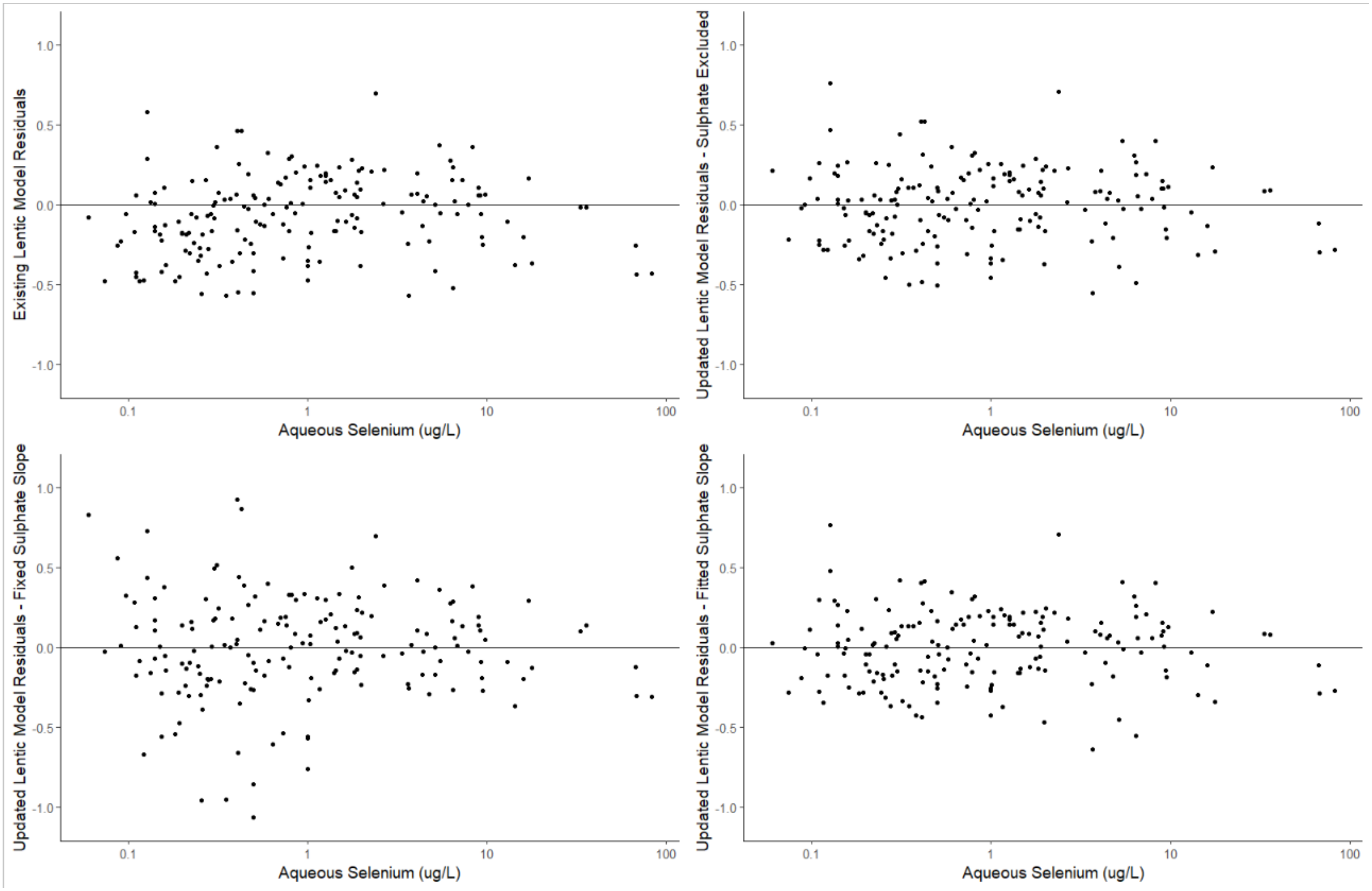

Figure 11: Model residuals for the four candidate lentic models outlined in Table 4

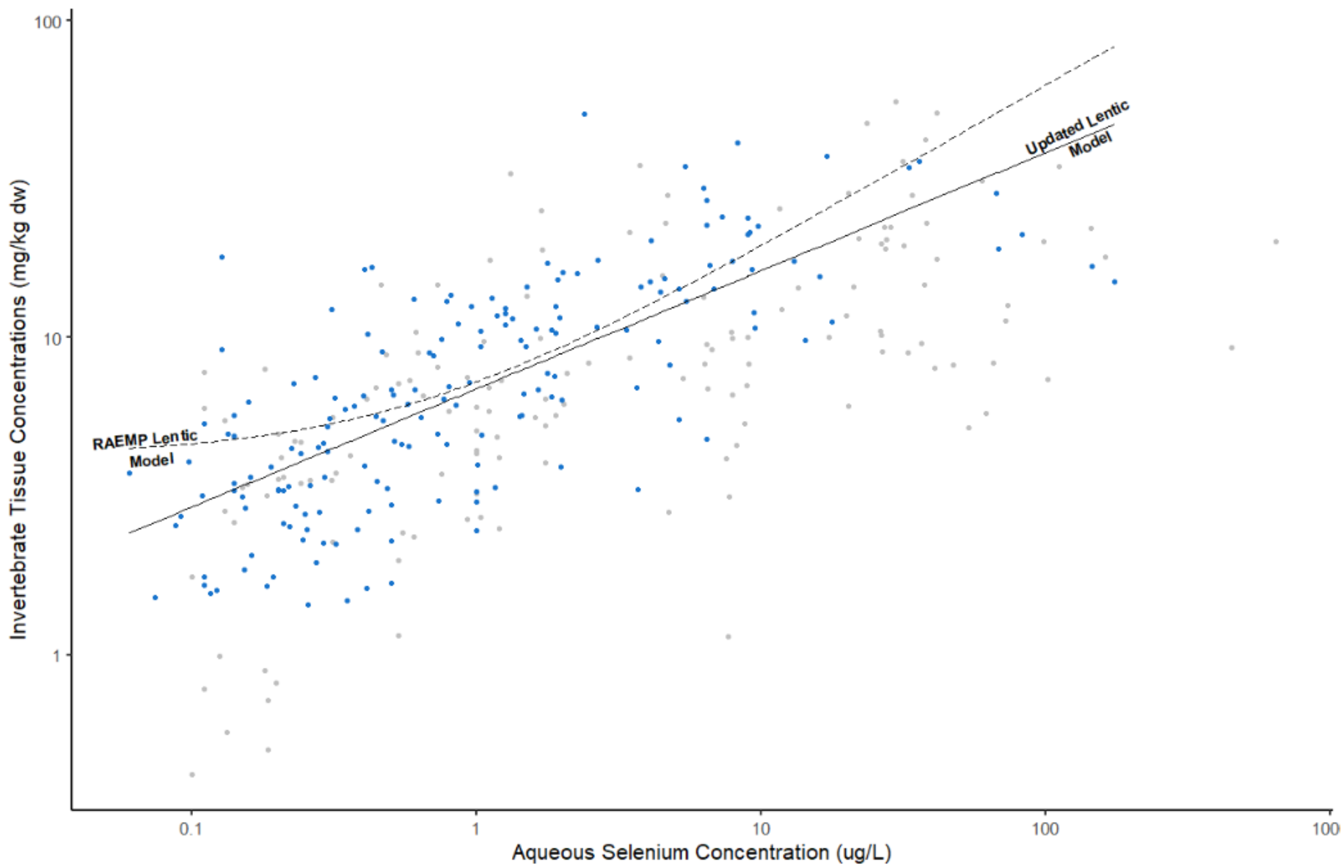

Figure 12: Comparison of the updated lentic model to the Orr et al. (2012) lentic model

3.3.1 Uncertainty and Sensitivity Analysis for Key Assumptions

Key decisions made in the model selection process for the updated lentic model include the identification of lentic habitat criteria and use of these criteria to select sites for model derivation, the exclusion of samples from actively managed mine sediment ponds, and the exclusion of samples with reported invertebrate tissue concentrations of selenium ≤1 mg/kg.

The model calculation process is highly sensitive to decisions of which sites to include. As shown in Figure 10, the provisional lentic criteria were designed to select cases where positive residuals were observed while limiting the number of cases where negative residuals were observed. This selection introduces an intentional bias into the analysis, such that the fitted lentic model describes the upper portion of the scatter of data on Figure 10, which is assumed to represent fully lentic conditions.

A related source of uncertainty for the lentic habitat criteria is the availability and consistency of habitat information. Some or all of the assessed habitat characteristics were available for 259 of 323 cases, but the level of detail available varied greatly between source reports. Consistency in ongoing monitoring programs and reporting will help to reduce uncertainty related to habitat characteristics going forward.

As described in Section 3.2.1, samples collected from actively managed mine sediment ponds were excluded from model derivation. Mine sediment ponds tend to have aqueous selenium concentrations at the high end of the monitored range in lentic areas. Figure 12 shows that lentic sites with aqueous selenium concentrations greater than ~50 µg/L had negative residuals to the updated model. Therefore, including these sites in model derivation would decrease the slope of the model, which would result in a worsening of residual structure and a poorer characterization of “fully lentic” patterns of bioaccumulation in natural lentic areas.

Including the eight cases with invertebrate selenium concentrations ≤1 mg/kg would increase the slope of the model from 0.397 to 0.447, which would result in poorer overall model diagnostics (RMSE=0.268; r^2=0.56; AIC=42.8; worse residual structure). The observation that six of the eight anomalous points came from Grave Lake Marsh suggests that there may be some site-specific factor there that is not relevant to the rest of the Elk Valley. It may be relevant that Grave Lake Marsh has atypically low aqueous sulphate concentrations (<0.3 to 4.2 mg/L), but the reason for the anomalous invertebrate selenium concentrations is unknown.

4.0 SUMMARY OF UPDATED MODELS

Final updated models are summarized in Table 5. The datasets used to derive the models included aqueous selenium concentrations from 0.1 to 425 µg/L (lotic models) and from 1.0 to 82.5 µg/L (lentic model). It may be reasonable to extrapolate the models to aqueous selenium concentrations beyond these ranges (noting that the models were derived on a log scale), but such extrapolation would increase uncertainty in model predictions.

Table 5: Selected Updated Models for Lotic and Lentic Environments

Habitat Type	Candidate Model	Model Equation	*n*	RMSE	r^2
Lotic	Updated model excluding sulphate	$log_{10}[Se]_{inv} = 0.720 + 0.071 \times log_{10}[Se]_{aq}$	565	0.144	0.15
	Updated model including sulphate	$log_{10}[Se]_{inv} = 0.929 + 0.143 \times log_{10}[Se]_{aq} - 0.142 \times log_{10}[SO_4]_{aq}$	535	0.135	0.20
Lentic	Updated model excluding sulphate	$log_{10}[Se]_{inv} = 0.847 + 0.397 \times log_{10}[Se]_{aq}$	174	0.235[(a)]	0.56

Notes: *n* = number of data points included; RMSE = root-mean squared error; r^2 = coefficient of determination; $log_{10}[Se]_{inv}$ = log-transformed invertebrate tissue selenium concentration (mg/kg); $log_{10}[Se]_{aq}$= log-transformed aqueous selenium concentration (µg/L)
[(a)]RMSE for sites meeting lentic criteria. Residual scatter for a dataset including both lentic and semi-lentic sites was asymmetrical, with RMSE=0.236 for positive residuals and RMSE=0.350 for negative residuals. See text in Section 3.3 for details.

5.0 CLOSURE

We trust the above meets your present requirements. If you have any questions or require additional details, please contact the undersigned.

Golder Associates Ltd.

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Environmental Scientist

Adrian de Bruyn, PhD, RPBio
Associate, Senior Environmental Scientist

https://golderassociates.sharepoint.com/sites/118048/project files/6 deliverables/04_task 4 (se models)/2. b-model report/19133414_task4_bmodelmemo_rev0_final.docx

Attachments: Attachment A - Compiled Lotic Dataset
Attachment B - Supplementary Habitat Characteristic Plots

6.0 REFERENCES

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ATTACHMENT A

Compiled Lotic Dataset

Table A-1

Compiled Lotic Dataset for Paired Invertebrate Tissue Selenium and Aqueous Selenium and Sulphate Concentrations

Invertebrate Monitoring Station	Year	Month	Invertebrate Tissue Selenium (mg/kg dw)	N of Invertebrate Tissue Samples	Water Monitoring Station	Aqueous Selenium (ug/L)	Aqueous Sulphate (mg/L)	EVWQP Pairing Code	Dataset	Speciation
CRUKO	2012	September	5.32	1	CRUKO	<0.1	15.5	SYN	EVWQP	Lotic
ELDGR	2012	September	9.78	1	ELDGR	11.2	61.4	SYN	EVWQP	Lotic
Boivin Creek	2002	June	9.22	1	RefLotic	0.5	-	RefLotic	EVWQP	Lotic
FO23	2009	August	9.68	1	LC_LC5	17.9	135.0	SM	EVWQP	Lotic
DRCK	2012	September	5.89	1	DRCK	1.7	7.7	SYN	EVWQP	Lotic
ELUQU	2009	August	6.11	1	GH_ER2	0.8	12.6	GeoSM	EVWQP	Lotic
ERCK	2012	September	6.28	1	ERCK	96.6	545.0	SYN	EVWQP	Lotic
MI3	2009	May	5.42	1	EV_MC3	1.1	22.7	GeoSM	EVWQP	Lotic
DRCK	2009	September	9.94	5	GH_DC1	1.6	7.4	SM	EVWQP	Lotic
FOBKS	2012	September	8.84	1	FOBKS	31.9	186.0	SYN	EVWQP	Lotic
OLDDU	2012	September	5.78	1	OLDDU	0.8	31.0	SYN	EVWQP	Lotic
MCCR	2013	September	2.03	1	MCCR	0.3	178.0	SYN	EVWQP	Lotic
MP1	2009	June	5.49	1	MP1	6.2	-	SYN	EVWQP	Lotic
UFR	2006	August	5.67	1	RefLotic	0.5	-	RefLotic	EVWQP	Lotic
FO23	2009	May	5.76	1	LC_LC5	37.3	170.0	SM	EVWQP	Lotic
MI25	2009	May	3.27	1	CM_MC1	<0.5	9.4	SM	EVWQP	Lotic
WIHR	2012	September	4.22	1	WIHR	<0.1	51.0	SYN	EVWQP	Lotic
FODHE	2012	September	8.88	1	FODHE	18.0	93.7	SYN	EVWQP	Lotic
UFR	1996	September	6.84	1	RefLotic	0.5	-	RefLotic	EVWQP	Lotic
ELUFO	2012	September	5.76	1	ELUFO	1.1	25.9	SYN	EVWQP	Lotic
FODGH	2012	September	9.26	1	FODGH	33.8	160.0	SYN	EVWQP	Lotic
FODPO	2012	September	6.18	1	FODPO	76.3	256.0	SYN	EVWQP	Lotic
LI8	1996	September	8.69	1	LI8	10.5	-	SYN	EVWQP	Atypical Speciation (Lotic)
AL4	2006	August	3.92	1	RefLotic	0.5	-	RefLotic	EVWQP	Lotic
FO28	2012	September	9.20	1	FO28	38.9	146.0	SYN	EVWQP	Lotic
LI8	2001	October	5.20	1	LI8	13.3	-	SYN	EVWQP	Atypical Speciation (Lotic)
PAUKO	2012	September	4.16	1	PAUKO	0.1	49.3	SYN	EVWQP	Lotic
VEUKO	2012	September	5.23	1	VEUKO	<0.1	17.1	SYN	EVWQP	Lotic
EL19	2009	June	9.37	1	EV_ER4	5.3	34.9	GeoSM	EVWQP	Lotic
EL1	2009	May	6.69	2	EV_ER1	6.6	47.3	SM	EVWQP	Lotic
EL19	2012	September	6.56	3	EL19	11.1	59.7	SYN	EVWQP	Lotic
ER3	2013	September	6.58	1	ER3	10.0	63.4	SYN	EVWQP	Lotic
OLDLI	2012	September	6.61	1	OLDLI	0.8	36.9	SYN	EVWQP	Lotic
MIDAG	2012	September	6.39	1	MIDAG	3.5	161.0	SYN	EVWQP	Lotic
GRCK	2012	September	9.32	1	GRCK	25.3	134.0	SYN	EVWQP	Lotic
VICK	2012	September	3.68	1	VICK	0.4	48.3	SYN	EVWQP	Lotic
UFR	2001	October	3.70	1	UFR	0.6	-	SYN	EVWQP	Lotic
MI25	2012	September	4.55	1	MI25	0.2	14.0	SYN	EVWQP	Lotic
MI5	2012	September	5.60	1	MI5	2.0	88.2	SYN	EVWQP	Lotic
AL4	2012	September	5.55	1	AL4	0.6	13.7	SYN	EVWQP	Lotic
Gold Creek	2002	June	4.78	1	Gold Creek	1.0	-	AdjM	EVWQP	Lotic
RACK	2012	September	3.88	1	RACK	0.6	35.0	SYN	EVWQP	Lotic
ELH93	2012	September	4.09	1	ELH93	5.9	45.6	SYN	EVWQP	Lotic
DACK	2012	September	4.21	1	DACK	1.2	71.9	SYN	EVWQP	Lotic
LE1	2012	August	5.69	6	MW_LC1	0.6	4.6	SM	EVWQP	Lotic
EWCK	2001	October	3.60	1	EWCK	1.3	-	SYN	EVWQP	Lotic
DRCK	2013	September	5.38	1	LC_DC1	1.8	7.9	SYN	EVWQP	Lotic
FR4	2011	October	3.86	5	FR_UFR1	0.5	42.1	SM	EVWQP	Lotic
EL1	1996	September	4.29	1	EL1	2.2	-	SYN	EVWQP	Lotic
HECK	2011	October	4.27	5	FR_HC3	0.9	60.2	SM	EVWQP	Lotic
MI3	2012	September	4.53	1	MI3	1.3	53.2	SYN	EVWQP	Lotic
SLINE	2012	September	4.83	1	SLINE	1.3	47.3	SYN	EVWQP	Lotic
MICH3	2012	August	5.44	5	CM_MC2	4.7	120.3	GeoSM	EVWQP	Lotic
ALB	2012	September	5.42	1	ALB	<0.1	11.2	SYN	EVWQP	Lotic
OLDLOW	2012	September	5.24	1	OLDLOW	0.7	36.2	SYN	EVWQP	Lotic
EL1	2001	October	4.20	1	EL1	3.3	-	SYN	EVWQP	Lotic
CA1	2012	August	2.74	5	MW_CC1	0.6	4.1	SM	EVWQP	Lotic
AC	2003	July	3.00	1	AC	1.0	15.0	AdjM	EVWQP	Lotic
SN1	2012	August	5.58	5	MW_SC1	0.8	4.9	SM	EVWQP	Lotic
FOBSC	2001	October	3.10	1	FOBSC	17.0	-	SYN	EVWQP	Lotic
AL4	2001	October	2.30	1	AL4	0.6	-	SYN	EVWQP	Lotic
TRCK	2012	August	5.45	5	MW_TC1	0.6	9.5	SM	EVWQP	Lotic
KICK	2015	September	0.40	1	KICK	109.0	327.0	SYN	Update	Lotic
FOUEW	2016	September	1.01	1	FOUEW	58.8	231.0	PrevYear	Update	Lotic
LI24	2012	September	5.14	1	LI24	1.6	47.1	SYN	EVWQP	Lotic
CHCK	2013	September	5.41	2	CHCK	0.6	19.2	SYN	EVWQP	Lotic
LI24	2001	October	5.40	1	LI24	1.8	-	SYN	EVWQP	Lotic
MP1	2012	September	9.04	1	MP1	36.1	143.0	SYN	EVWQP	Lotic
FOUFO	2013	September	9.64	1	FOUFO	83.5	283.0	SYN	EVWQP	Lotic
EL20	2012	September	8.31	1	EL20	1.2	18.1	SYN	EVWQP	Lotic
AGCK	2012	September	4.87	1	AGCK	1.2	12.2	SYN	EVWQP	Lotic
Lynx Creek	2002	June	5.12	2	Lynx Creek	<0.1	-	SYN	EVWQP	Lotic
ELUQU	2006	August	4.01	1	GH_ER2	1.1	10.7	SM	EVWQP	Lotic
MI2	2009	August	8.38	1	EV_MC1	6.0	58.5	GeoSM	EVWQP	Lotic
LI24	2009	June	4.36	1	LC_LC1	0.6	15.0	SM	EVWQP	Lotic
DUCK	2012	September	3.47	1	DUCK	0.5	9.3	SYN	EVWQP	Lotic
FO26	2012	September	4.22	3	FO26	0.6	43.3	SYN	EVWQP	Lotic
UFR	2009	May	4.26	1	RefLotic	0.5	-	RefLotic	EVWQP	Lotic
FOBCP	2012	September	7.95	1	FOBCP	117.0	418.0	SYN	EVWQP	Lotic
WH1	2012	August	5.33	5	MW_WC1	0.8	4.0	SM	EVWQP	Lotic
FRDFB	2013	September	7.52	1	FRDFB	41.5	157.0	SYN	EVWQP	Lotic
FOUL	2012	September	7.95	1	FOUL	35.2	147.0	SYN	EVWQP	Lotic
FO23	2012	September	7.47	1	FO23	38.1	146.0	SYN	EVWQP	Lotic

Table A-1

Compiled Lotic Dataset for Paired Invertebrate Tissue Selenium and Aqueous Selenium and Sulphate Concentrations

Invertebrate Monitoring Station	Year	Month	Invertebrate Tissue Selenium (mg/kg dw)	N of Invertebrate Tissue Samples	Water Monitoring Station	Aqueous Selenium (ug/L)	Aqueous Sulphate (mg/L)	EVWQP Pairing Code	Dataset	Speciation
OLUP	2012	September	4.78	1	OLUP	0.6	8.4	SYN	EVWQP	Lotic
KODCR	2012	September	3.40	1	KODCR	<0.1	15.4	SYN	EVWQP	Lotic
ELUFO	1996	September	4.62	1	ELUFO	0.4	-	SYN	EVWQP	Lotic
MI2	2012	September	5.97	1	MI2	10.9	93.1	SYN	EVWQP	Lotic
MI25	2006	August	6.01	1	CM_MC1	<0.5	13.9	SM	EVWQP	Lotic
EL12	2012	September	3.57	1	EL12	0.4	7.5	SYN	EVWQP	Lotic
FOUKI	2012	September	8.55	1	FOUKI	33.6	181.0	SYN	EVWQP	Lotic
ELUGH	2012	September	6.12	1	ELUGH	0.8	15.4	SYN	EVWQP	Lotic
AL4	2009	August	6.13	1	RefLotic	0.5	-	RefLotic	EVWQP	Lotic
MI3	2006	August	6.21	1	EV_MC3	0.9	18.9	SM	EVWQP	Lotic
EWCK	2012	September	6.22	1	EWCK	1.0	35.2	SYN	EVWQP	Lotic
ELDFE	2012	September	6.23	1	ELDFE	8.2	59.2	SYN	EVWQP	Lotic
FO9	2012	September	6.44	1	FO9	38.8	160.0	SYN	EVWQP	Lotic
BU40	2012	September	6.30	1	BU40	0.2	37.4	SYN	EVWQP	Lotic
CORCK	2012	September	3.89	1	CORCK	14.5	657.0	SYN	EVWQP	Lotic
ELDEL	2012	September	6.32	1	ELDEL	1.2	24.8	SYN	EVWQP	Lotic
FI1	2012	August	4.27	5	MW_FC1	0.4	5.2	SM	EVWQP	Lotic
FO21	2009	May	4.61	1	FO21	0.4	-	SYN	EVWQP	Lotic
KICK	2012	September	4.61	1	KICK	106.0	294.0	SYN	EVWQP	Lotic
FOBSC	2012	September	8.40	1	FOBSC	53.8	26.5	SYN	EVWQP	Lotic
ELELKO	2012	September	6.34	1	ELELKO	8.0	58.3	SYN	EVWQP	Lotic
HENUP	2012	September	6.38	1	HENUP	0.8	54.1	SYN	EVWQP	Lotic
KOUVE	2012	September	4.45	1	KOUVE	<0.1	8.3	SYN	EVWQP	Lotic
GHCKU	2012	September	9.97	1	GHCKU	187.0	771.0	SYN	EVWQP	Lotic
MIDCO	2012	September	3.57	3	MIDCO	6.6	348.0	SYN	EVWQP	Lotic
MIUCO	2012	September	7.00	1	MIUCO	0.3	31.0	SYN	EVWQP	Lotic
VEUP	2012	September	4.88	1	VEUP	<0.1	9.3	SYN	EVWQP	Lotic
NGD1	2012	September	6.86	1	NGD1	29.0	109.0	SYN	EVWQP	Lotic
ERBC	2001	October	3.20	1	ERBC	0.9	-	SYN	EVWQP	Lotic
FO21	2006	August	3.62	1	RefLotic	0.5	-	RefLotic	EVWQP	Lotic
ELELKO	2013	September	6.89	1	LC_ElkoRes	8.4	59.5	SYN	EVWQP	Lotic
MI3	2001	October	2.30	1	EV_MC3	0.8	24.4	SM	EVWQP	Lotic
MI5	2006	August	4.00	1	CM_MC2	3.2	181.0	SM	EVWQP	Lotic
MI2	2001	October	4.70	1	EV_MC1	8.1	39.6	SM	EVWQP	Lotic
AX1	2012	August	5.10	6	MW_AC1	0.5	12.8	SM	EVWQP	Lotic
LkMtn1c	2010	August	7.96	5	LkMtn1c	<0.5	2.3	SM	EVWQP	Lotic
LILC3	2012	September	6.99	1	LILC3	79.7	248.0	SYN	EVWQP	Atypical Speciation (Lotic)
HENFO	2012	September	8.06	1	HENFO	26.1	116.0	SYN	EVWQP	Lotic
FO9	2006	August	4.44	1	LC_LC6	18.2	114.4	SM	EVWQP	Lotic
FOUEW	2012	September	8.28	1	FOUEW	58.6	214.0	SYN	EVWQP	Lotic
GRDS	2012	September	7.99	1	GRDS	23.4	131.0	SYN	EVWQP	Atypical Speciation (Lotic)
MI2	1996	September	6.82	1	MI2	7.1	-	SYN	EVWQP	Lotic
LI8	2003	July	6.72	1	LI8	20.9	80.0	SYN	EVWQP	Atypical Speciation (Lotic)
ER1	2013	September	6.76	1	ER1	1.3	20.2	SYN	EVWQP	Lotic
ELUCA	1996	September	2.74	1	GH_ER2	1.0	-	AdjM	EVWQP	Lotic
FODPO	2018	December	1.99	3	FODPO	106.0	369.0	SYN	Update	Lotic
ELUSP	2012	September	6.79	1	ELUSP	9.4	58.1	SYN	EVWQP	Lotic
EL1	2012	September	6.82	3	EL1	9.1	61.4	SYN	EVWQP	Lotic
LI8	2012	September	7.77	1	LI8	44.7	148.0	SYN	EVWQP	Atypical Speciation (Lotic)
FOUNGD	2012	September	8.15	1	FOUNGD	23.5	96.0	SYN	EVWQP	Lotic
LkMtn1b	2010	August	10.28	5	LkMtn1b	20.3	66.0	SM	EVWQP	Lotic
PADAL	2012	September	8.23	1	PADAL	0.1	52.2	SYN	EVWQP	Lotic
LI8	2009	June	10.77	1	LC_LC4	13.7	44.7	SM	EVWQP	Atypical Speciation (Lotic)
FR3	2010	August	10.85	5	FR_UFR1	0.6	29.5	GeoSM	EVWQP	Lotic
LIDSL	2012	September	8.08	1	LIDSL	54.1	177.0	SYN	EVWQP	Atypical Speciation (Lotic)
BOCK	2012	September	11.21	1	BOCK	414.0	973.0	SYN	EVWQP	Atypical Speciation (Lotic)
MI2	2009	May	10.89	1	EV_MC1	3.3	35.6	GeoSM	EVWQP	Lotic
FO22	1996	September	10.70	1	FO22	8.6	-	SYN	EVWQP	Lotic
FO23	2006	August	10.00	1	LC_LC5	19.9	109.6	SM	EVWQP	Lotic
FODGH	2001	October	10.20	1	GH_FR1	8.3	-	SM	EVWQP	Lotic
FO9	2009	June	6.92	1	LC_LC6	16.5	76.2	SM	EVWQP	Lotic
CADCK	2012	September	3.39	1	CADCK	0.6	12.2	SYN	EVWQP	Lotic
ELDER 2	2013	September	7.35	1	ELDER 2	28.1	117.0	SYN	EVWQP	Lotic
SKUKO	2012	September	1.39	1	SKUKO	<0.1	3.6	SYN	EVWQP	Lotic
EL1	2006	July	7.08	1	EV_ER1	5.4	41.2	GeoSM	EVWQP	Lotic
KOUCR	2012	September	3.02	1	KOUCR	<0.1	15.4	SYN	EVWQP	Lotic
POCK	2012	September	5.20	1	POCK	76.5	419.0	SYN	EVWQP	Lotic
OCNM	2012	September	3.91	1	OCNM	1.3	52.4	SYN	EVWQP	Lotic
FO29	2012	September	7.94	1	FO29	38.4	141.0	SYN	EVWQP	Lotic
HACKUS	2012	September	8.40	1	HACKUS	38.3	189.0	SYN	EVWQP	Lotic
FOUSH	2012	September	7.65	1	FOUSH	36.1	146.0	SYN	EVWQP	Lotic
ELUEL	2012	September	7.86	1	ELUEL	1.1	18.1	SYN	EVWQP	Lotic
HACKDS	2012	September	6.53	1	HACKDS	33.5	169.0	SYN	EVWQP	Atypical Speciation (Lotic)
LI8	2006	August	7.81	1	LC_LC3	6.9	170.2	SM	EVWQP	Atypical Speciation (Lotic)
CHCK	2012	September	3.92	1	CHCK	0.5	16.3	SYN	EVWQP	Lotic
BUUQ	2012	September	5.26	1	BUUQ	0.6	36.2	SYN	EVWQP	Lotic
ELUFE	2012	September	6.45	1	ELUFE	9.0	60.5	SYN	EVWQP	Lotic
MICH1	2012	August	6.49	6	EV_MC3	1.0	29.2	SM	EVWQP	Lotic
WWRL	2012	September	6.49	1	WWRL	0.2	7.4	SYN	EVWQP	Lotic
MI5	2009	May	5.84	1	CM_MC2	3.4	123.5	GeoSM	EVWQP	Lotic
MC1	2012	August	6.67	6	MW_MC1	1.0	10.1	SM	EVWQP	Lotic
MICH2	2012	August	4.81	5	EV_MC3	1.0	29.2	SM	EVWQP	Lotic
MI2	2006	August	6.69	1	EV_MC1	10.8	62.3	SM	EVWQP	Lotic

Table A-1

Compiled Lotic Dataset for Paired Invertebrate Tissue Selenium and Aqueous Selenium and Sulphate Concentrations

Invertebrate Monitoring Station	Year	Month	Invertebrate Tissue Selenium (mg/kg dw)	N of Invertebrate Tissue Samples	Water Monitoring Station	Aqueous Selenium (ug/L)	Aqueous Sulphate (mg/L)	EVWQP Pairing Code	Dataset	Speciation
EL19	2006	August	8.63	1	EV_ER4	5.4	26.7	SM	EVWQP	Lotic
GRUHA	2012	September	6.98	1	GRUHA	1.8	24.2	SYN	EVWQP	Lotic
LI8	2009	September	8.02	1	LC_LC4	24.5	65.9	SM	EVWQP	Atypical Speciation (Lotic)
FO22	2009	August	11.83	1	GH_PC2	23.6	-	SM	EVWQP	Lotic
FR2	2010	August	11.85	5	FR_FRDSNGD1	6.0	-	PostAnnGeo	EVWQP	Lotic
FR1	2010	August	12.13	5	GH_PC2	31.9	-	SM	EVWQP	Lotic
FO22	2012	September	12.44	1	FO22	71.1	245.0	SYN	EVWQP	Lotic
LC1	2012	September	12.70	1	GH_LC2	51.9	249.0	SM	EVWQP	Lotic
FOULC	2013	September	13.60	1	FOULC	39.4	159.0	SYN	EVWQP	Lotic
GHCKD	2012	September	14.76	1	GHCKD	172.0	722.0	SYN	EVWQP	Atypical Speciation (Lotic)
THCK-R4	2012	October	15.04	5	GH_TC1	134.0	688.0	SM	EVWQP	Atypical Speciation (Lotic)
AQCK	2012	September	15.49	1	AQCK	5.0	58.2	SYN	EVWQP	Lotic
LkMtn1a	2010	August	16.33	5	LkMn1a	19.1	97.7	SM	EVWQP	Lotic
SWCK	2012	September	17.57	1	SWCK	693.0	1570.0	SYN	EVWQP	Atypical Speciation (Lotic)
SW1	2010	August	25.69	5	GH_SC1	328.0	956.0	SM	EVWQP	Atypical Speciation (Lotic)
CATCK	2012	September	26.47	1	CATCK	651.0	1750.0	SYN	EVWQP	Atypical Speciation (Lotic)
THCK-R1	2012	September	28.94	2	GH_TC1	149.0	713.0	SM	EVWQP	Atypical Speciation (Lotic)
LI24	2006	August	1.44	1	LC_LC1	1.3	170.2	SM	EVWQP	Lotic
THCK	2012	September	35.62	1	THCK	158.0	725.0	SYN	EVWQP	Atypical Speciation (Lotic)
WOCK	2012	September	2.88	2	WOCK	44.2	501.0	SYN	EVWQP	Lotic
FODPO	2018	March	3.50	1	FODPO	105.0	400.0	SYN	Update	Lotic
CORCK	2019	September	2.60	3	CORCK	18.1	679.0	SYN	Update	Lotic
ELUQU	2001	October	1.50	1	ELUQU	0.8	-	SYN	EVWQP	Lotic
ERSC5	2017	September	14.79	3	ERSC5	0.6	15.8	SYN	Update	Atypical Speciation (Lotic)
HACKOUT	2016	September	31.38	1	HAPD	34.0	194.0	GeoSYN	Update	Atypical Speciation (Lotic)
EV_AQ1	2013	September	11.00	1	EV_AQ1	5.1	52.5	SM	Update	Lotic
EV_BC1	2013	September	22.40	3	EV_BC1	443.0	1000.0	SM	Update	Atypical Speciation (Lotic)
EV_CS1	2013	October	8.85	1	EV_CS1	10.5	101.0	SM	Update	Lotic
EV_ER3B	2013	October	3.85	1	EV_ER3B	13.4	71.1	SM	Update	Lotic
EV_EC1	2013	September	5.93	1	EV_EC1	104.0	550.0	SM	Update	Lotic
EV_FC1	2013	September	2.47	1	EV_FC1	11.4	75.1	SM	Update	Lotic
EV_GT1	2013	September	16.20	1	EV_GT1	298.0	1190.0	SM	Update	Atypical Speciation (Lotic)
EV_GV1	2013	September	7.98	1	EV_GV1	25.6	134.0	SM	Update	Lotic
EV_GV3	2013	September	4.25	1	EV_GV3	1.9	25.7	SM	Update	Lotic
EV_HC1	2013	September	10.65	3	EV_HC1	37.6	178.0	SM	Update	Lotic
EV_MC3A	2013	October	4.37	1	EV_MC3A	3.0	48.6	SM	Update	Lotic
EV_OC1	2013	September	12.40	1	EV_OC1	0.6	49.7	GeoSM	Update	Lotic
EV_QC1	2013	September	14.30	1	EV_QC1	6.0	28.2	SM	Update	Lotic
EV_SPR2	2013	October	10.70	1	EV_SPR2	5.1	73.3	SM	Update	Lotic
EV_HC6	2013	September	4.76	1	EV_HC6	0.7	14.2	SM	Update	Lotic
UM1	2012	August	6.43	5	MW_UW1	0.4	2.5	PostAnnGeo	Update	Lotic
LILC3	2017	April	35.77	10	LC_LC3	60.8	396.0	GeoSM	Update	Atypical Speciation (Lotic)
HACKIN	2016	September	7.02	1	HAPD	34.0	194.0	GeoSYN	Update	Lotic
GH_MC1	2013	September	5.42	1	GH_MC1	0.7	56.9	SM	Update	Lotic
GH_PC1	2013	September	6.74	1	GH_PC1	75.7	438.0	SM	Update	Lotic
GH_WADE	2013	September	5.28	1	GH_WADE	0.7	19.8	SM	Update	Lotic
GH_WILLOW	2013	September	8.12	3	GH_WILLOW	0.9	32.8	SM	Update	Lotic
GH_WOLF	2013	September	6.29	1	GH_WOLF	0.5	22.2	SM	Update	Atypical Speciation (Lotic)
CHCK	2013	July	3.38	1	CHCK	0.4	8.9	SYN	Update	Lotic
EL1	2013	July	6.22	1	EV_ER1 (Order - ER3)	7.1	41.0	GeoSM	Update	Lotic
EL19	2013	July	6.67	1	EL19	8.5	42.3	SYN	Update	Lotic
WWR	2013	July	4.21	1	WWR	0.2	4.3	SYN	Update	Lotic
FO23	2013	July	10.70	1	FO23	28.2	104.0	SYN	Update	Lotic
FO29	2013	July	8.40	1	FO29	32.5	112.0	SYN	Update	Lotic
FO52	2013	July	7.28	1	FO52	52.1	144.0	SYN	Update	Lotic
FOBC	2013	July	8.59	1	FOBC	15.7	67.9	SYN	Update	Lotic
LI8	2013	July	6.73	2	LC_LC4	21.5	86.5	GeoSM	Update	Atypical Speciation (Lotic)
MI2	2013	July	6.37	1	EV_MC1	5.0	44.7	SM	Update	Lotic
LI24	2014	September	3.99	1	LC_LC1	1.4	30.2	SM	Update	Lotic
SLINE	2014	September	5.97	1	LC_SLC	1.0	27.2	SM	Update	Lotic
LILC3	2014	September	16.69	1	LC_LC3	31.2	209.0	SM	Update	Atypical Speciation (Lotic)
LIDSL	2014	September	13.67	1	LC_LCDSSLCC	27.7	137.0	SM	Update	Atypical Speciation (Lotic)
LI8	2014	September	8.42	1	LC_LC4	23.3	121.0	SM	Update	Atypical Speciation (Lotic)
FO26	2015	September	4.90	1	FO26	0.8	44.8	SYN	Update	Lotic
FODHE	2015	September	6.55	1	FODHE	9.8	84.4	SYN	Update	Lotic
FOUNGD	2015	September	7.19	1	FOUNGD	24.0	116.0	SYN	Update	Lotic
FODNGD	2015	September	6.21	1	FODNGD	23.4	119.0	SYN	Update	Lotic
MP1	2015	September	5.85	1	MP1	23.2	124.0	SYN	Update	Lotic
FOUSH	2015	September	6.04	1	FOUSH	25.5	128.0	SYN	Update	Lotic
FOUKI	2015	September	5.13	1	FOUKI	23.3	150.0	SYN	Update	Lotic
FOBKS	2015	September	6.00	1	FOBKS	23.9	149.0	SYN	Update	Lotic
FOBSC	2015	September	7.51	1	FOBSC	33.9	183.0	SYN	Update	Lotic
FOBCP	2015	September	7.68	1	FOBCP	63.8	284.0	SYN	Update	Lotic
FO10-SP1	2015	September	7.13	1	FO10-SP1	60.6	75.8	SYN	Update	Lotic
FODPO	2015	September	6.92	1	FODPO	68.2	264.0	SYN	Update	Lotic
FO22	2015	September	7.08	1	FO22	68.0	263.0	SYN	Update	Lotic
FOUEW	2015	September	5.84	1	FOUEW	58.8	231.0	SYN	Update	Lotic
FO28/LC-FRUS	2015	September	7.01	1	FO28/LC-FRUS	34.8	155.0	SYN	Update	Lotic
FO29	2015	September	7.54	1	FO29	34.8	148.0	SYN	Update	Lotic
FODGH	2015	September	8.36	1	FODGH	37.0	175.0	SYN	Update	Lotic
HENFO	2015	September	9.62	1	HENFO	13.9	99.1	SYN	Update	Lotic
NGD1/NGDu	2015	September	11.54	1	NGD1/NGDu	14.6	85.7	SYN	Update	Lotic
SWCK	2015	September	18.54	1	SWCK	505.0	1450.0	SYN	Update	Atypical Speciation (Lotic)

Table A-1

Compiled Lotic Dataset for Paired Invertebrate Tissue Selenium and Aqueous Selenium and Sulphate Concentrations

Invertebrate Monitoring Station	Year	Month	Invertebrate Tissue Selenium (mg/kg dw)	N of Invertebrate Tissue Samples	Water Monitoring Station	Aqueous Selenium (ug/L)	Aqueous Sulphate (mg/L)	EVWQP Pairing Code	Dataset	Speciation
CATCK	2015	September	10.54	1	CATCK	547.0	1860.0	SYN	Update	Atypical Speciation (Lotic)
POCK	2015	September	5.59	1	POCK	64.9	428.0	SYN	Update	Lotic
LC_DCDS	2015	September	5.68	1	LC_DCDS	1.5	12.3	SYN	Update	Atypical Speciation (Lotic)
LC_DC1	2015	September	5.17	1	LC_DC1	1.3	9.1	SYN	Update	Atypical Speciation (Lotic)
GHCKU	2015	September	10.81	1	GHCKU	107.0	737.0	SYN	Update	Lotic
GHCKD	2015	September	21.67	1	GHCKD	86.1	696.0	SYN	Update	Atypical Speciation (Lotic)
LC_GRCK	2015	September	6.51	1	LC_GRCK	1.7	48.9	SYN	Update	Lotic
LI24	2015	September	5.44	1	LI24	2.2	44.1	SYN	Update	Lotic
SLINE	2015	September	3.95	1	SLINE	1.7	58.9	SYN	Update	Lotic
FO9	2015	September	7.19	1	FO9	33.6	160.0	SYN	Update	Lotic
FRUL	2015	September	7.29	1	FRUL	33.8	159.0	SYN	Update	Lotic
FO23	2015	September	6.37	1	FO23	34.7	164.0	SYN	Update	Lotic
LILC3	2015	September	13.31	1	LILC3	51.4	279.0	SYN	Update	Atypical Speciation (Lotic)
LIDSL	2015	September	8.89	1	LIDSL	37.6	212.0	SYN	Update	Atypical Speciation (Lotic)
LI8	2015	September	9.31	1	LI8	32.6	183.0	SYN	Update	Atypical Speciation (Lotic)
ELUGH	2015	September	4.20	1	ELUGH	0.7	19.0	SYN	Update	Lotic
EL20	2015	September	4.98	1	EL20	1.3	28.8	SYN	Update	Lotic
ELUEL	2015	September	4.33	1	ELUEL	1.4	28.9	SYN	Update	Lotic
ELDEL	2015	September	4.64	1	ELDEL	1.3	31.4	SYN	Update	Lotic
ELUFO	2015	September	5.31	1	ELUFO	1.2	32.6	SYN	Update	Lotic
WOCK	2015	September	11.63	1	WOCK	128.0	983.0	SYN	Update	Lotic
THCK	2015	September	18.14	1	THCK	98.1	702.0	SYN	Update	Atypical Speciation (Lotic)
MI25	2015	September	4.61	1	MI25	<0.25	14.5	SYN	Update	Lotic
MIUCO	2015	September	4.78	1	MIUCO	0.3	20.1	SYN	Update	Lotic
EL19	2015	September	5.22	1	EL19	9.8	69.9	SYN	Update	Lotic
ELDGR	2015	September	6.06	1	ELDGR	10.0	72.6	SYN	Update	Lotic
ELUSP	2015	September	5.47	1	ELUSP	9.4	67.7	SYN	Update	Lotic
HACKUS	2015	September	6.57	1	HACKUS	39.5	212.0	SYN	Update	Lotic
HACKDS	2015	September	8.04	1	HACKDS	35.2	192.0	SYN	Update	Atypical Speciation (Lotic)
GRCK	2015	September	7.53	1	GRCK	25.1	155.0	SYN	Update	Lotic
GRDS	2015	September	10.46	1	GRDS	22.8	152.0	SYN	Update	Atypical Speciation (Lotic)
OCNM	2015	September	6.83	1	OCNM	0.3	22.5	SYN	Update	Lotic
MIDCO	2015	September	4.38	1	MIDCO	5.7	288.0	SYN	Update	Lotic
MIDAG	2015	September	7.55	1	MIDAG	2.4	71.7	SYN	Update	Lotic
MI5	2015	September	5.11	1	MI5	2.1	63.6	SYN	Update	Lotic
MI3	2015	September	2.33	1	MI3	1.8	59.0	SYN	Update	Lotic
MI2	2015	September	6.61	1	MI2	13.1	119.0	SYN	Update	Lotic
CORCK	2015	September	3.48	1	CORCK	14.1	659.0	SYN	Update	Lotic
DC2	2018	November	29.76	3	DC2	20.9	82.1	SYN	Update	Atypical Speciation (Lotic)
EL1	2015	September	5.29	1	EL1	10.7	76.5	SYN	Update	Lotic
ELUFE	2015	September	5.79	1	ELUFE	9.4	75.1	SYN	Update	Lotic
ELDFE	2015	September	6.35	1	ELDFE	8.8	73.0	SYN	Update	Lotic
ELELKO	2015	September	8.88	1	ELELKO	8.6	69.9	SYN	Update	Lotic
ELH93	2015	September	12.40	1	ELH93	7.9	61.9	SYN	Update	Lotic
FO26	2016	September	3.53	1	FR_UFR1	0.6	38.8	SM	Update	Lotic
HENUP	2016	September	3.77	1	FR_HC3	1.1	57.6	SM	Update	Lotic
FOUKI	2016	September	5.24	1	FR_FR2	28.9	173.0	SM	Update	Lotic
FOBCP	2016	September	9.72	1	FR_FRCP1 (Compliance)	70.0	298.0	GeoSM	Update	Lotic
FODPO	2016	September	3.80	1	GH_PC2	66.8	235.8	PrevAnnGeo	Update	Lotic
FO28/LC-FRUS	2016	September	9.14	1	FO28/LC-FRUS	34.8	155.0	PrevYear	Update	Lotic
FO29	2016	September	8.52	1	FO29	34.8	148.0	PrevYear	Update	Lotic
FODGH	2016	September	7.25	1	GH_FR1 (Order - FR4 and Compliance)	40.1	196.7	GeoSM	Update	Lotic
LC_DCDS	2016	September	7.53	1	LC_DCDS	2.1	16.8	SM	Update	Atypical Speciation (Lotic)
LC_DC1	2016	September	7.72	1	LC_DC1	1.6	10.3	SM	Update	Atypical Speciation (Lotic)
LI24	2016	September	3.77	1	LC_LC1	2.7	60.9	SM	Update	Lotic
SLINE	2016	September	4.08	1	LC_SLC	1.5	56.1	GeoSM	Update	Lotic
FO23	2016	September	6.73	1	LC_LC5 (Order - FR5)	30.7	166.0	SM	Update	Lotic
LCUT	2016	September	6.22	1	LC_LCUSWLC	35.9	214.3	GeoSM	Update	Lotic
LIDSL	2016	September	16.00	1	LC_LCDSSLCC (Compliance)	30.7	248.0	SM	Update	Atypical Speciation (Lotic)
LI8	2016	September	11.80	1	LC_LC4	23.5	201.0	SM	Update	Atypical Speciation (Lotic)
ELUGH	2016	September	4.35	1	GH_ER2	0.9	20.6	SM	Update	Lotic
EL20	2016	September	5.13	1	GH_ERC (Compliance)	1.2	29.0	GeoSM	Update	Lotic
MI25	2016	September	4.47	1	CM_MC1	0.2	12.8	SM	Update	Lotic
EL19	2016	September	7.58	1	EV_ER4 (Order - ER2)	10.6	72.3	SM	Update	Lotic
HACKUS	2016	September	8.06	5	EV_HC6	0.7	15.6	SM	Update	Lotic
HACKDS	2016	September	13.35	5	EV_HC1 (Compliance)	36.3	204.0	SM	Update	Atypical Speciation (Lotic)
MIUCO	2016	September	4.06	2	MIUCO	0.3	20.1	PrevYear	Update	Lotic
MIDCO	2016	September	4.23	2	CM_MC2 (Compliance)	7.0	339.4	GeoSM	Update	Lotic
MI2	2016	September	7.79	1	MI2	13.1	119.0	PrevYear	Update	Lotic
CORCK	2016	September	2.72	1	CM_CC1	17.0	705.0	SM	Update	Lotic
EL1	2016	September	5.72	1	EV_ER1 (Order - ER3)	9.4	74.4	GeoSM	Update	Lotic
ELUFE	2016	September	7.36	1	RG_ELKFERNIE	8.5	71.0	SM	Update	Lotic
ELELKO	2016	September	9.50	1	RG_ELKORES (Order - ER4)	7.9	70.2	SM	Update	Lotic
ELH93	2016	September	12.14	1	RG_ELKMOUTH	5.9	55.8	GeoSM	Update	Lotic
FO10 (now lotic)	2015	September	7.00	3	FO10 (now lotic)	73.5	238.0	GeoSYN	Update	Lotic
DCDS	2019	May	27.78	3	DCDS	13.1	38.3	SYN	Update	Atypical Speciation (Lotic)

Invertebrate Monitoring Station	Year	Month	Invertebrate Tissue Selenium (mg/kg dw)	N of Invertebrate Tissue Samples	Water Monitoring Station	Aqueous Selenium (ug/L)	Aqueous Sulphate (mg/L)	EVWQP Pairing Code	Dataset	Speciation
LIDSL	2013	July	4.30	1	LC_LCDSSLCC (Compliance)	36.3	143.2	PostAnnGeo	Update	Atypical Speciation (Lotic)
LIDSL	2014	July	5.60	1	LC_LCDSSLCC (Compliance)	28.0	127.0	SM	Update	Atypical Speciation (Lotic)
FO23	2014	July	8.80	1	LC_LC5 (Order - FR5)	24.3	90.3	SM	Update	Lotic
LI24	2014	September	3.99	1	LC_LC1	1.4	30.2	SM	Update	Lotic
SLINE	2014	September	5.97	1	LC_SLC	1.0	27.2	SM	Update	Lotic
LILC3	2014	September	16.69	1	LC_LC3	31.3	209.0	SM	Update	Atypical Speciation (Lotic)
LIDSL	2014	September	13.67	1	LC_LCDSSLCC	27.7	137.0	SM	Update	Atypical Speciation (Lotic)
LI8	2014	September	8.42	1	LC_LC4	23.2	121.0	SM	Update	Atypical Speciation (Lotic)
LC_DCDS	2014	September	5.92	1	LC_DCDS	1.3	10.6	SM	Update	Atypical Speciation (Lotic)
LC_FRDSDC	2014		6.12	1	LC_FRDSDC	31.7	125.0	SM	Update	Lotic
LC_DC1	2014	September	4.87	1	LC_DC1	1.4	8.7	SM	Update	Atypical Speciation (Lotic)
LC_GRCK	2014	September	6.39	1	LC_GRCK	1.8	44.1	SM	Update	Lotic
LC_FRUS	2014	September	7.44	1	LC_FRUS	31.8	129.0	SM	Update	Lotic
LC_FRUSDC	2014	September	5.56	1	LC_FRUSDC	32.8	127.0	SM	Update	Lotic
LC_UC	2014		4.16	1	LC_US	0.2	14.0	SM	Update	Lotic
LI24	2017	September	4.96	10	LI24	3.3	70.8	SYN	Update	Lotic
SLINE	2017	April	4.04	10	LC_SLC	1.4	64.6	SM	Update	Lotic
SLINE	2017	September	4.79	10	SLINE	1.5	61.1	SYN	Update	Lotic
LCUT	2017	February	4.95	5	LC_LCUSWLC	46.8	306.0	SYN	Update	Lotic
LCUT	2017	April	6.26	10	LC_LCUSWLC	49.1	277.0	GeoSYN	Update	Lotic
LCUT	2017	September	5.89	10	LCUT	50.7	255.0	SYN	Update	Lotic
LCUT	2017	November	6.65	10	LCUT	124.0	460.0	SYN	Update	Lotic
LCUT	2017	December	6.67	10	LCUT	116.0	447.0	SYN	Update	Lotic
LILC3	2017	February	26.14	5	LC_LC3	38.0	419.0	GeoSM	Update	Atypical Speciation (Lotic)
LILC3	2017	September	23.86	10	LILC3	42.9	303.0	SYN	Update	Atypical Speciation (Lotic)
LILC3	2017	November	25.50	10	LILC3	72.4	331.0	SYN	Update	Atypical Speciation (Lotic)
LILC3	2017	December	26.92	10	LILC3	73.8	360.0	SYN	Update	Atypical Speciation (Lotic)
LIDSL	2017	March	12.06	5	LC_LCDSSLCC (Compliance)	37.4	281.7	GeoSM	Update	Atypical Speciation (Lotic)
LIDSL	2017	April	10.19	10	LC_LCDSSLCC (Compliance)	40.8	272.8	GeoSM	Update	Atypical Speciation (Lotic)
LIDSL	2017	September	13.57	10	LC_LCDSSLCC (Compliance)	36.0	244.4	GeoSM	Update	Atypical Speciation (Lotic)
LIDSL	2017	November	12.11	10	LIDSL	59.1	265.0	SYN	Update	Atypical Speciation (Lotic)
LIDSL	2017	December	11.12	10	LC_LCDSSLCC (Compliance)	59.5	275.0	SYN	Update	Atypical Speciation (Lotic)
LI8	2017	March	8.74	5	LI8	51.0	236.0	SYN	Update	Atypical Speciation (Lotic)
LI8	2017	April	8.45	10	LC_LC4	30.5	211.8	GeoSM	Update	Atypical Speciation (Lotic)
LI8	2017	September	11.36	10	LI8	29.1	198.0	SYN	Update	Atypical Speciation (Lotic)
LI8	2017	November	8.28	10	LI8	46.8	219.0	SYN	Update	Atypical Speciation (Lotic)
LI8	2017	December	8.91	10	LI8	47.5	224.0	SYN	Update	Atypical Speciation (Lotic)
FRUL	2017	April	6.84	10	LC_LC6	46.4	210.0	SM	Update	Lotic
FRUL	2017	September	8.12	10	FRUL	43.6	174.0	SYN	Update	Lotic
FO23	2017	April	6.55	10	LC_LC5 (Order - FR5)	37.8	176.0	GeoSM	Update	Lotic
FO23	2017	September	8.76	10	FO23	40.1	178.0	SYN	Update	Lotic
LISP23	2017	September	16.75	10	LISP23	35.0	237.0	SYN	Update	Atypical Speciation (Lotic)
LISP24	2017	September	16.12	10	LISP24	36.6	249.0	SYN	Update	Atypical Speciation (Lotic)
LISP24	2017	November	14.13	10	LISP24	59.0	274.0	SYN	Update	Atypical Speciation (Lotic)
LISP24	2017	December	12.75	10	LISP24	56.0	281.0	SYN	Update	Atypical Speciation (Lotic)
LIDCOM	2017	September	9.28	10	LIDCOM	31.6	216.0	SYN	Update	Atypical Speciation (Lotic)
LIDCOM	2017	November	7.38	10	LC_LCC	50.3	238.0	SYN	Update	Atypical Speciation (Lotic)
LIDCOM	2017	December	9.32	10	LC_LCC	53.2	244.0	SYN	Update	Atypical Speciation (Lotic)
FO26	2017	September	3.20	1	FO26	0.7	45.9	SYN	Update	Lotic
HENUP	2017	September	4.90	1	HENUP	1.0	67.2	SYN	Update	Lotic
FODHE	2017	September	8.10	1	FODHE	21.3	120.0	SYN	Update	Lotic
FOUNGD	2017	September	6.50	1	FOUNGD	53.0	198.0	SYN	Update	Lotic
FODNGD	2017	September	5.60	1	FODNGD	54.3	198.0	SYN	Update	Lotic
MP1	2017	September	5.60	1	MP1	52.2	223.0	SYN	Update	Lotic
FOUSH	2017	September	6.50	1	FOUSH	47.9	214.0	SYN	Update	Lotic
FOUKI	2017	September	6.70	3	FOUKI	44.5	232.0	SYN	Update	Lotic
FOBKS	2017	September	6.55	3	FOBKS	44.9	209.0	SYN	Update	Lotic
FOBSC	2017	September	5.00	1	FOBSC	78.9	291.0	SYN	Update	Lotic
FOBCP	2017	September	6.40	1	FOBCP	128.0	504.0	SYN	Update	Lotic
FRCP1SW	2017	September	6.90	1	FR_FRCP1SW	131.0	522.0	SYN	Update	Lotic
FRUPO	2017	September	7.40	1	FR_FRRD	98.9	362.0	SM	Update	Lotic
FODPO	2017	September	7.00	1	FODPO	89.6	336.0	SYN	Update	Lotic
FO22	2017	September	5.40	1	FO22	83.3	328.0	SYN	Update	Lotic
FOUEW	2017	September	6.60	1	FOUEW	77.9	271.0	SYN	Update	Lotic
LC_DC1	2017	September	7.00	1	LC_DC1	3.1	15.7	SYN	Update	Atypical Speciation (Lotic)
LC_DCDS	2017	September	7.90	1	LC_DCDS	7.9	39.1	SYN	Update	Atypical Speciation (Lotic)
LC_FRUS	2017	September	6.50	1	LC_FRUS	50.2	193.0	SYN	Update	Lotic
FO29	2017	September	7.50	1	FO29	49.2	184.0	SYN	Update	Lotic
FODGH	2017	September	6.10	1	FODGH	38.9	191.0	SYN	Update	Lotic
ELUGH	2017	September	6.60	1	GH_ER2	0.7	14.4	SYN	Update	Lotic
EL20	2017	September	5.10	1	GH_ERC	1.1	20.7	GeoSM	Update	Lotic
ALUSM	2017	September	6.90	1	ALUSM	0.6	15.8	SYN	Update	Lotic
MI25	2017	September	2.50	1	MI25	0.2	13.4	SYN	Update	Lotic
HACKDS	2017	September	11.00	1	HACKDS	38.9	193.0	SYN	Update	Atypical Speciation (Lotic)

Invertebrate Monitoring Station	Year	Month	Invertebrate Tissue Selenium (mg/kg dw)	N of Invertebrate Tissue Samples	Water Monitoring Station	Aqueous Selenium (ug/L)	Aqueous Sulphate (mg/L)	EVWQP Pairing Code	Dataset	Speciation
CORCK	2017	September	4.30	1	CORCK	14.2	838.0	SYN	Update	Lotic
EL19	2017	September	5.50	1	EL19	9.1	61.6	SYN	Update	Lotic
MIUCO	2017	September	2.80	1	MIUCO	0.3	16.3	SYN	Update	Lotic
MIDCO	2017	September	2.90	1	MIDCO	10.0	568.0	SYN	Update	Lotic
MI3	2017	September	5.50	1	MI3	1.8	86.6	SYN	Update	Lotic
MI2	2017	September	6.50	1	MI2	19.8	144.0	SYN	Update	Lotic
EL1	2017	September	5.60	1	EV_ER1	9.4	73.6	SM	Update	Lotic
ELUFE	2017	September	8.60	1	ELUFE	8.2	68.3	SYN	Update	Lotic
ELELKO	2017	September	7.00	1	ELELKO	7.5	64.0	SYN	Update	Lotic
ELH93	2017	September	8.15	3	ELH93	6.1	54.0	SYN	Update	Lotic
HENUP	2017	September	7.04	1	FR_HC3	1.0	64.4	SM	Update	Lotic
HENFO	2017	September	5.23	1	FR_HC1	26.0	152.0	SM	Update	Lotic
FR_MQ1	2017	September	6.15	1	FR_MQ1	-	-	-	Update	Lotic
LCUT	2018	March	6.27	10	LCUT	425	983.0	SYN	Update	Lotic
FOUKI	2018	March	5.10	3	FOUKI	55.3	289.0	SYN	Update	Lotic
FOBKS	2018	March	5.68	3	FOBKS	52.9	279.0	SYN	Update	Lotic
FRUPO	2018	March	6.80	1	FRUPO	111	361.0	SYN	Update	Lotic
EV_DC1	2013	September	47.50	1	EV_DC1	180	754.0	SM	Update	Atypical Speciation (Lotic)
FO22	2018	March	6.90	1	FO22	100	375.0	SYN	Update	Lotic
FOUEW	2018	March	6.30	1	FOUEW	86.3	335.0	SYN	Update	Lotic
SLINE	2018	March	5.11	10	SLINE	1.63	82.0	SYN	Update	Lotic
LILC3	2018	March	13.89	10	LILC3	104	406.0	SYN	Update	Atypical Speciation (Lotic)
LISP24	2018	March	7.40	10	WL_DCP_SP24	75.3	345.0	SYN	Update	Atypical Speciation (Lotic)
LIDSL	2018	March	6.43	10	LIDSL	70.35	315.0	SYN	Update	Atypical Speciation (Lotic)
LIDCOM	2018	March	7.67	10	LC_LCC	61.1	267.0	SYN	Update	Atypical Speciation (Lotic)
LI8	2018	March	6.79	10	LI8	51	236.0	SYN	Update	Atypical Speciation (Lotic)
FRUL	2018	March	6.83	10	FRUL	53	227.0	SYN	Update	Lotic
FO23	2018	March	6.33	10	FO23	50.8	224.0	SYN	Update	Lotic
LCUT	2018	April	6.94	10	LCUT	258	767.0	SYN	Update	Lotic
LILC3	2018	April	17.41	10	LILC3	90.9	404.0	SYN	Update	Atypical Speciation (Lotic)
LISP24	2018	April	10.64	10	WL_DCP_SP24	77.2	350.0	SYN	Update	Atypical Speciation (Lotic)
LIDSL	2018	April	9.17	10	LC_LCDSSLCC	82.5	333.0	SYN	Update	Atypical Speciation (Lotic)
LIDCOM	2018	April	9.23	10	LC_LCC	62.3	282.0	SYN	Update	Atypical Speciation (Lotic)
LI8	2018	April	9.97	10	LI8	59.6	254.0	SYN	Update	Atypical Speciation (Lotic)
FO23	2018	April	7.83	10	FO23	52.4	247.0	SYN	Update	Lotic
LILC3	2016	September	35.20	1	LC_LC3	34.9	346.0	SM	Update	Atypical Speciation (Lotic)
SPDC	2019	May	30.91	3	SPDC	15.8	46.6	SYN	Update	Atypical Speciation (Lotic)
GATE	2018	September	13.00	1	GATE	77.3	804.0	SYN	Update	Atypical Speciation (Lotic)
BOCK	2018	September	16.00	1	BOCK	73	741.0	SYN	Update	Atypical Speciation (Lotic)
ERCK	2018	September	6.00	1	ERCK	139	729.0	SYN	Update	Lotic
MIDER	2018	September	10.00	1	MIDER	4.33	75.7	SYN	Update	Lotic
MIDGA	2018	September	10.00	1	MIDGA	42.1	434.0	SYN	Update	Lotic
ALSUM	2018	September	10.01	3	ALSUM	0.545	16.7	SYN	Update	Lotic
CORCK	2018	September	3.55	3	CORCK	12.8	836.0	SYN	Update	Lotic
MI2	2018	September	9.00	1	MI2	18.6	170.0	SYN	Update	Lotic
MIDAG	2018	September	4.35	3	MIDAG	4.6	265.0	SYN	Update	Lotic
AGCK	2018	September	7.53	3	AGCK	1.6	19.6	SYN	Update	Lotic
HACKDS	2018	September	18.89	5	HACKDS	35.2	195.0	SYN	Update	Atypical Speciation (Lotic)
HACKUS	2018	September	10.00	1	HACKUS	41.7	219.0	SYN	Update	Lotic
MIDCO	2018	September	3.37	5	MIDCO	7.48	531.0	SYN	Update	Lotic
MIUCO	2018	September	4.90	3	MIUCO	0.262	16.4	SYN	Update	Lotic
MI25	2018	September	4.41	3	MI25	0.215	13.5	SYN	Update	Lotic
MI5	2018	September	6.44	3	MI5	2.57	133.0	SYN	Update	Lotic
MIULE	2018	September	8.76	3	MIULE	3.36	192.0	SYN	Update	Lotic
MIDBO	2018	September	7.80	1	MIDBO	18.4	164.0	SYN	Update	Lotic
MICOMP	2018	September	8.68	5	MICOMP	19.2	170.0	SYN	Update	Lotic
BACK	2018	September	9.60	1	BACK	7.35	44.1	SYN	Update	Lotic
SMCK	2018	September	6.20	1	SMCK	1.76	75.8	SYN	Update	Lotic
GRDS	2018	September	15.00	1	GRDS	25.9	154.0	SYN	Update	Atypical Speciation (Lotic)
EL19	2018	September	5.47	5	EL19	11.1	69.2	SYN	Update	Lotic
LE1	2018	September	3.20	1	LE1	0.43	-	SYN	Update	Lotic
ELUEL	2018	September	6.73	5	ELUEL	1.57	24.1	SYN	Update	Lotic
ELDFE	2018	September	7.40	1	ELDFE	9.56	76.3	SYN	Update	Lotic
GHCKD	2018	September	21.00	1	GHCKD	161	882.0	SYN	Update	Atypical Speciation (Lotic)
ELH93	2018	September	8.89	3	ELH93	7.2	59.9	SYN	Update	Lotic
ELELKO	2018	September	10.65	5	ELEKO	9.45	76.4	SYN	Update	Lotic
UCWER	2018	September	8.36	3	UCWER	2.81	48.6	SYN	Update	Lotic
FODGH	2018	September	10.16	5	FODGH	43.8	188.0	SYN	Update	Lotic
EL1	2018	September	6.67	5	EL1	10.9	80.4	SYN	Update	Lotic
FO28	2018	September	9.03	3	FO28	42.7	176.0	SYN	Update	Lotic
FO29	2018	September	8.81	3	FO29	41.4	171.0	SYN	Update	Lotic
THCK	2018	September	26.00	1	THCK	162	1030.0	SYN	Update	Atypical Speciation (Lotic)
DC1	2018	September	10.97	3	DC1	8.08	33.9	SYN	Update	Atypical Speciation (Lotic)
EL20	2018	September	6.72	5	EL20	1.59	24.0	SYN	Update	Lotic
ELUGH	2018	September	6.35	3	ELUGH	0.766	18.0	SYN	Update	Lotic
WWRL	2018	September	6.76	3	WWRL	0.391	-	SYN	Update	Lotic
GRCK	2018	September	6.90	1	GRCK	2.01	35.2	SYN	Update	Lotic
GH-SCW3	2018	September	11.96	3	GH-SCW3	22.3	158.0	SYN	Update	Lotic
ERSC5	2018	September	8.81	3	ERSC5	0.73	19.2	SYN	Update	Atypical Speciation (Lotic)
ER1A	2018	September	9.04	3	ER1A	0.7	19.2	SYN	Update	Lotic
ERSC4	2018	September	5.29	3	ERSC4	0.702	19.2	SYN	Update	Atypical Speciation (Lotic)
FC1	2018	September	4.80	1	FC1	19.6	116.0	SYN	Update	Lotic
FODHE	2018	September	12.56	3	FODHE	19.8	125.0	SYN	Update	Lotic

Invertebrate Monitoring Station	Year	Month	Invertebrate Tissue Selenium (mg/kg dw)	N of Invertebrate Tissue Samples	Water Monitoring Station	Aqueous Selenium (ug/L)	Aqueous Sulphate (mg/L)	EVWQP Pairing Code	Dataset	Speciation
HENUP	2018	September	3.81	3	HENUP	1.11	62.4	SYN	Update	Lotic
FOUEW	2018	September	6.43	3	FOUEW	70.9	272.0	SYN	Update	Lotic
FOUKI	2018	September	10.11	3	FOUKI	38	197.0	SYN	Update	Lotic
FO26	2018	September	3.76	3	FO26	0.567	45.5	SYN	Update	Lotic
FO22	2018	September	7.89	5	FO22	77.7	306.0	SYN	Update	Lotic
FOBKS	2018	September	10.29	3	FOBKS	36.2	191.0	SYN	Update	Lotic
FRUPO	2018	September	8.59	3	FRUPO	82	288.0	SYN	Update	Lotic
FOBCP	2018	September	8.62	5	FOBCP	200	748.0	SYN	Update	Lotic
FOBSC	2018	September	8.73	3	FOBSC	61.3	252.0	SYN	Update	Lotic
MP1	2018	September	7.84	3	MP1	44.3	183.0	SYN	Update	Lotic
FOUSH	2018	September	8.35	3	FOUSH	43.2	186.0	SYN	Update	Lotic
FODNGD	2018	September	8.32	3	FODNGD	42	178.0	SYN	Update	Lotic
FOUNGD	2018	September	6.95	3	FOUNGD	37.9	171.0	SYN	Update	Lotic
FODPO	2018	September	5.56	3	FODPO	81.7	331.0	SYN	Update	Lotic
LIDSL	2018	September	7.17	10	LIDSL	60.3	268.0	SYN	Update	Atypical Speciation (Lotic)
LIDCOM	2018	September	7.67	10	LIDCOM	51.9	216.0	SYN	Update	Atypical Speciation (Lotic)
FO23	2018	September	9.25	10	FO23	41.9	179.0	SYN	Update	Lotic
FRUL	2018	September	11.27	10	FRUL	42	176.0	SYN	Update	Lotic
LILC3	2018	September	10.26	10	LILC3	84.6	364.0	SYN	Update	Atypical Speciation (Lotic)
SLINE	2018	September	6.54	10	SLINE	1.48	63.2	SYN	Update	Lotic
LCUT	2018	September	7.84	10	LCUT	175	551.0	SYN	Update	Lotic
LI24	2018	September	6.76	10	LI24	2.89	72.2	SYN	Update	Lotic
LI8	2018	September	8.98	10	LI8	47.2	209.0	SYN	Update	Atypical Speciation (Lotic)
LISP24	2018	September	8.14	10	LISP24	59.6	283.0	SYN	Update	Atypical Speciation (Lotic)
BOCK	2016	September	50.47	1	EV_BC1	111	789.0	SM	Update	Atypical Speciation (Lotic)
SPDC	2018	December	42.70	5	SPDC	24.1	95.2	SYN	Update	Atypical Speciation (Lotic)
FOBSC	2018	December	49.10	3	FOBSC	49.1	261.0	SYN	Update	Lotic
ER1A	2019	September	6.44	3	ER1A	2.07	32.9	SYN	Update	Lotic
ERSC2	2019	September	8.96	3	ERSC2	9.48	79.7	SYN	Update	Atypical Speciation (Lotic)
ERSC4	2019	September	5.11	3	ERSC4	0.838	19.8	SYN	Update	Atypical Speciation (Lotic)
DC1	2019	May	9.39	3	DC1	7.48	24.3	SYN	Update	Atypical Speciation (Lotic)
DC1	2019	June	8.73	5	DC1	7.73	26.6	SYN	Update	Atypical Speciation (Lotic)
DC1	2019	September	8.93	5	DC1	17.1	50.7	SYN	Update	Atypical Speciation (Lotic)
DC1	2019	December	8.34	5	DC1	15.1	46.4	SYN	Update	Atypical Speciation (Lotic)
THCK	2019	September	63.18	3	THCK	124	809.5	SYN	Update	Atypical Speciation (Lotic)
DCDS	2019	June	22.30	5	DCDS	15	50.2	SYN	Update	Atypical Speciation (Lotic)
DCDS	2019	September	26.06	5	DCDS	34.2	103.0	SYN	Update	Atypical Speciation (Lotic)
DCDS	2019	December	26.56	5	DCDS	47.9	137.0	SYN	Update	Atypical Speciation (Lotic)
FRB	2019	September	8.69	5	FRB	41.1	160.0	SYN	Update	Lotic
FRB	2019	December	6.30	5	FRB	42.5	172.0	SYN	Update	Lotic
FRUS	2019	September	8.67	5	FRUS	40.3	158.0	SYN	Update	Lotic
FRUS	2019	December	6.72	5	FRUS	45.6	178.0	SYN	Update	Lotic
GRCK	2019	September	6.28	3	GRCK	1.84	49.7	SYN	Update	Lotic
AGCK	2019	September	7.25	3	AGCK	1.72	19.8	SYN	Update	Lotic
ALUSM	2019	September	5.67	3	ALUSM	0.62	16.3	SYN	Update	Lotic
BACK	2019	September	10.00	1	BACK	7.53	41.7	SYN	Update	Lotic
CLODE	2019	September	9.90	1	CLODE	159	452.0	SYN	Update	Atypical Speciation (Lotic)
EL1	2019	September	5.22	5	EL1	9.3	69.0	SYN	Update	Lotic
EL19	2019	September	7.00	5	EL19	9.6	61.3	SYN	Update	Lotic
EL20	2019	September	5.52	5	EL20	1.83	29.0	SYN	Update	Lotic
ELDFE	2019	September	7.40	1	ELDFE	8.5	63.8	SYN	Update	Lotic
ELELKO	2019	September	8.06	5	ELELKO	8.07	62.9	SYN	Update	Lotic
ELH93	2019	September	8.16	3	ELH93	6.54	52.4	SYN	Update	Lotic
ELUEL	2019	September	6.02	5	ELUEL	1.43	23.6	SYN	Update	Lotic
ELUGH	2019	September	4.98	3	ELUGH	0.745	17.5	SYN	Update	Lotic
ERCK	2019	September	5.50	1	ERCK	133	732.0	SYN	Update	Lotic
ERSC5	2019	September	8.97	3	ERSC5	2.05	30.8	SYN	Update	Atypical Speciation (Lotic)
FC1	2019	September	6.50	1	FC1	11.6	79.9	SYN	Update	Lotic
FO22	2019	February	5.35	3	FO22	99	343.0	SYN	Update	Lotic
FO22	2019	June	7.99	3	FO22	52.1	189.0	SYN	Update	Lotic
FO22	2019	September	7.09	5	FO22	70.4	245.0	SYN	Update	Lotic
FO22	2019	December	4.88	3	FO22	87.7	286.0	SYN	Update	Lotic
FO23	2019	January	7.29	10	FO23	45	193.0	SYN	Update	Lotic
FO23	2019	March	5.56	4	FO23	46.6	217.0	SYN	Update	Lotic
FO23	2019	April	7.52	10	FO23	44.6	211.0	SYN	Update	Lotic
FO23	2019	September	8.42	10	FO23	33.5	157.0	SYN	Update	Lotic
FO23	2019	December	6.64	10	FO23	45	187.0	SYN	Update	Lotic
FO26	2019	June	3.47	3	FO26	0.603	17.4	SYN	Update	Lotic
FO26	2019	September	3.03	3	FO26	0.61	37.8	SYN	Update	Lotic
FOBCP	2019	February	9.32	3	FOBCP	-	-	SYN	Update	Lotic
FOBCP	2019	June	4.03	3	FOBCP	28.3	107.0	SYN	Update	Lotic
FOBCP	2019	September	7.68	5	FOBCP	57.5	234.0	SYN	Update	Lotic
FOBKS	2019	February	13.00	1	FOBKS	47.1	298.0	SYN	Update	Lotic
FOBKS	2019	June	4.24	3	FOBKS	10.2	63.1	SYN	Update	Lotic
FOBKS	2019	September	8.26	3	FOBKS	34.8	168.0	SYN	Update	Lotic
FOBKS	2019	December	7.25	3	FOBKS	53	231.0	SYN	Update	Lotic
FOBSC	2019	June	5.36	3	FOBSC	14.2	71.6	SYN	Update	Lotic
FOBSC	2019	September	12.33	3	FOBSC	51.8	230.0	SYN	Update	Lotic
FOBSC	2019	December	6.75	3	FOBSC	135	458.0	SYN	Update	Lotic
FODGH	2019	September	8.23	5	FODGH	40.9	175.0	SYN	Update	Lotic
FODHE	2019	June	5.42	3	FODHE	4.28	36.1	SYN	Update	Lotic
FODHE	2019	September	5.70	3	FODHE	13.5	89.9	SYN	Update	Lotic
FODHE	2019	December	4.92	3	FODHE	21.8	132.0	SYN	Update	Lotic

Table A-1

Compiled Lotic Dataset for Paired Invertebrate Tissue Selenium and Aqueous Selenium and Sulphate Concentrations

Invertebrate Monitoring Station	Year	Month	Invertebrate Tissue Selenium (mg/kg dw)	N of Invertebrate Tissue Samples	Water Monitoring Station	Aqueous Selenium (ug/L)	Aqueous Sulphate (mg/L)	EVWQP Pairing Code	Dataset	Speciation
FODNGD	2019	February	6.63	3	FODNGD	54.4	272.0	SYN	Update	Lotic
FODNGD	2019	June	4.66	3	FODNGD	8.59	52.2	SYN	Update	Lotic
FODNGD	2019	September	6.32	3	FODNGD	30.2	137.0	SYN	Update	Lotic
FODNGD	2019	December	5.45	3	FODNGD	55.4	220.0	SYN	Update	Lotic
FODPO	2019	February	5.33	3	FODPO	99.6	375.0	SYN	Update	Lotic
FODPO	2019	June	5.12	3	FODPO	48.4	180.0	SYN	Update	Lotic
FODPO	2019	September	6.04	3	FODPO	69.7	255.0	SYN	Update	Lotic
FODPO	2019	December	3.90	3	FODPO	122	417.0	SYN	Update	Lotic
FOUCL	2019	September	6.12	3	FOUCL	16.5	98.7	SYN	Update	Lotic
FOUCL	2019	December	4.13	3	FOUCL	30	154.0	SYN	Update	Lotic
FOUEW	2019	February	4.88	3	FOUEW	85.5	315.0	SYN	Update	Lotic
FOUEW	2019	June	6.18	3	FOUEW	0.502	21.9	SYN	Update	Lotic
FOUEW	2019	September	6.71	3	FOUEW	61	218.0	SYN	Update	Lotic
FOUEW	2019	December	4.88	3	FOUEW	73.3	243.0	SYN	Update	Lotic
FOUKI	2019	February	4.66	3	FOUKI	35.15	294.0	SYN	Update	Lotic
FOUKI	2019	June	4.80	3	FOUKI	9.68	59.8	SYN	Update	Lotic
FOUKI	2019	September	7.95	3	FOUKI	31.2	163.0	SYN	Update	Lotic
FOUKI	2019	December	4.30	3	FOUKI	52.2	230.0	SYN	Update	Lotic
FOUNGD	2019	February	5.60	3	FOUNGD	48.4	260.0	SYN	Update	Lotic
FOUNGD	2019	June	4.89	3	FOUNGD	8.86	51.6	SYN	Update	Lotic
FOUNGD	2019	September	6.64	3	FOUNGD	27.7	129.0	SYN	Update	Lotic
FOUNGD	2019	December	4.59	3	FOUNGD	53.8	218.0	SYN	Update	Lotic
FOUSH	2019	February	7.59	3	FOUSH	61.2	289.0	SYN	Update	Lotic
FOUSH	2019	June	5.53	3	FOUSH	10.7	56.7	SYN	Update	Lotic
FOUSH	2019	September	5.83	3	FOUSH	36.3	159.0	SYN	Update	Lotic
FOUSH	2019	December	6.02	3	FOUSH	56.1	231.0	SYN	Update	Lotic
FRCP1SW	2019	June	12.12	3	FRCP1SW	30.9	116.0	SYN	Update	Lotic
FRCP1SW	2019	September	7.70	3	FRCP1SW	54.2	241.0	SYN	Update	Lotic
FRUL	2019	January	7.38	5	FRUL	52.4	208.0	SYN	Update	Lotic
FRUL	2019	March	6.74	10	FRUL	52.3	217.0	SYN	Update	Lotic
FRUL	2019	April	7.99	10	FRUL	54.8	232.0	SYN	Update	Lotic
FRUL	2019	September	9.92	10	FRUL	41.4	160.0	SYN	Update	Lotic
FRUL	2019	December	8.44	10	FRUL	48.3	186.0	SYN	Update	Lotic
FRUPO	2019	February	6.32	3	FRUPO	91.1	260.0	SYN	Update	Lotic
FRUPO	2019	June	6.75	3	FRUPO	39.1	141.0	SYN	Update	Lotic
FRUPO	2019	September	6.95	3	FRUPO	66.2	230.0	SYN	Update	Lotic
FRUPO	2019	December	4.32	3	FRUPO	100	307.0	SYN	Update	Lotic
GATE	2019	September	12.00	1	GATE	176	1020.0	SYN	Update	Atypical Speciation (Lotic)
GH-SCW3	2019	September	14.50	3	GH-SCW3	-	-	SYN	Update	Lotic
GHCKD	2019	September	17.00	1	GHCKD	116	606.0	SYN	Update	Atypical Speciation (Lotic)
GRDS	2019	September	14.00	1	GRDS	23	143.0	SYN	Update	Atypical Speciation (Lotic)
HACKDS	2019	September	16.95	5	HACKDS	32.4	176.0	SYN	Update	Atypical Speciation (Lotic)
HACKUS	2019	September	9.70	1	HACKUS	40.1	204.0	SYN	Update	Lotic
HENUP	2019	June	6.05	3	HENUP	42.8	160.0	SYN	Update	Lotic
HENUP	2019	September	4.54	3	HENUP	1.11	48.0	SYN	Update	Lotic
KICK	2019	September	5.20	1	KICK	106	284.0	SYN	Update	Lotic
LCUT	2019	January	6.03	9	LCUT	51.8	296.0	SYN	Update	Lotic
LCUT	2019	April	8.43	5	LCUT	49.3	315.0	SYN	Update	Lotic
LCUT	2019	May	3.80	9	LCUT	36	208.0	SYN	Update	Lotic
LCUT	2019	June	4.07	10	LCUT	26.1	150.0	SYN	Update	Lotic
LCUT	2019	July	3.24	10	LCUT	42	213.0	SYN	Update	Lotic
LCUT	2019	August	5.18	10	LCUT	81.5	296.0	SYN	Update	Lotic
LCUT	2019	September	7.63	10	LCUT	95.5	357.0	SM	Update	Lotic
LCUT	2019	December	4.46	10	LCUT	242	671.0	SYN	Update	Lotic
LE1	2019	September	5.79	3	LE1	0.459	4.9	SYN	Update	Lotic
LI24	2019	February	6.30	1	LI24	2.94	113.0	SYN	Update	Lotic
LI24	2019	April	6.67	10	LI24	1.93	37.6	SYN	Update	Lotic
LI24	2019	May	6.58	10	LI24	2.48	35.4	SYN	Update	Lotic
LI24	2019	June	5.42	10	LI24	1.72	23.1	SYN	Update	Lotic
LI24	2019	July	6.54	10	LI24	2.31	35.3	SYN	Update	Lotic
LI24	2019	August	6.70	10	LI24	2.94	49.9	SYN	Update	Lotic
LI24	2019	September	5.32	10	LI24	3.04	56.8	SYN	Update	Lotic
LI24	2019	December	3.56	6	LI24	3.4	87.8	SYN	Update	Lotic
LI8	2019	January	5.72	10	LI8	28	222.0	SYN	Update	Atypical Speciation (Lotic)
LI8	2019	February	6.59	10	LI8	24.7	227.0	SYN	Update	Atypical Speciation (Lotic)
LI8	2019	April	7.37	10	LI8	21.2	161.0	SYN	Update	Atypical Speciation (Lotic)
LI8	2019	May	6.08	10	LI8	15.3	120.0	SYN	Update	Atypical Speciation (Lotic)
LI8	2019	June	6.60	10	LI8	11.4	85.7	SYN	Update	Atypical Speciation (Lotic)
LI8	2019	July	6.35	10	LI8	21.9	122.0	SYN	Update	Atypical Speciation (Lotic)
LI8	2019	August	6.73	10	LI8	20.7	154.0	SYN	Update	Atypical Speciation (Lotic)
LI8	2019	September	6.47	10	LI8	32.2	154.0	SYN	Update	Atypical Speciation (Lotic)
LI8	2019	December	4.21	10	LI8	37.7	216.0	SYN	Update	Atypical Speciation (Lotic)
LIDCOM	2019	January	7.01	10	LIDCOM	32.2	248.0	SYN	Update	Atypical Speciation (Lotic)
LIDCOM	2019	February	7.68	10	LIDCOM	27.4	254.0	SYN	Update	Atypical Speciation (Lotic)
LIDCOM	2019	April	7.98	10	LIDCOM	24.4	181.0	SYN	Update	Atypical Speciation (Lotic)
LIDCOM	2019	September	6.45	10	LIDCOM	25.7	161.0	SYN	Update	Atypical Speciation (Lotic)
LIDCOM	2019	December	5.23	10	LIDCOM	33.2	241.0	SYN	Update	Atypical Speciation (Lotic)
LIDSL	2019	January	5.60	10	LIDSL	36.1	295.0	SYN	Update	Atypical Speciation (Lotic)
LIDSL	2019	February	6.50	10	LIDSL	31.8	306.0	SYN	Update	Atypical Speciation (Lotic)
LIDSL	2019	April	5.95	10	LIDSL	26.65	227.0	SYN	Update	Atypical Speciation (Lotic)
LIDSL	2019	May	7.01	10	LIDSL	19	147.0	SYN	Update	Atypical Speciation (Lotic)
LIDSL	2019	June	6.65	10	LIDSL	12.55	89.6	SYN	Update	Atypical Speciation (Lotic)
LIDSL	2019	July	5.37	10	LIDSL	27.3	136.0	SYN	Update	Atypical Speciation (Lotic)

Table A-1

Compiled Lotic Dataset for Paired Invertebrate Tissue Selenium and Aqueous Selenium and Sulphate Concentrations

Invertebrate Monitoring Station	Year	Month	Invertebrate Tissue Selenium (mg/kg dw)	N of Invertebrate Tissue Samples	Water Monitoring Station	Aqueous Selenium (ug/L)	Aqueous Sulphate (mg/L)	EVWQP Pairing Code	Dataset	Speciation
LIDSL	2019	August	5.97	10	LIDSL	25.3	178.0	SYN	Update	Atypical Speciation (Lotic)
LIDSL	2019	September	6.94	10	LIDSL	27.7	137.0	SYN	Update	Atypical Speciation (Lotic)
LIDSL	2019	December	4.64	10	LIDSL	60.85	282.0	SYN	Update	Atypical Speciation (Lotic)
LILC3	2019	January	8.44	10	LILC3	40.1	401.0	SYN	Update	Atypical Speciation (Lotic)
LILC3	2019	February	10.60	10	LILC3	34.8	412.0	SYN	Update	Atypical Speciation (Lotic)
LILC3	2019	April	11.03	10	LILC3	40.6	369.0	SYN	Update	Atypical Speciation (Lotic)
LILC3	2019	May	10.34	10	LILC3	26.1	210.0	SYN	Update	Atypical Speciation (Lotic)
LILC3	2019	June	7.67	10	LILC3	18.3	136.0	SYN	Update	Atypical Speciation (Lotic)
LILC3	2019	July	7.15	10	LILC3	32.3	157.0	SYN	Update	Atypical Speciation (Lotic)
LILC3	2019	August	8.04	10	LILC3	30.9	238.0	SYN	Update	Atypical Speciation (Lotic)
LILC3	2019	September	9.69	10	LILC3	38.8	261.0	SYN	Update	Atypical Speciation (Lotic)
LILC3	2019	December	7.61	10	LILC3	97.1	378.0	SYN	Update	Atypical Speciation (Lotic)
LISP24	2019	January	6.14	10	LISP24	29.7	314.0	SYN	Update	Atypical Speciation (Lotic)
LISP24	2019	February	7.06	10	LISP24	27.9	339.0	SYN	Update	Atypical Speciation (Lotic)
LISP24	2019	April	7.41	10	LISP24	25.8	229.0	SYN	Update	Atypical Speciation (Lotic)
LISP24	2019	September	6.54	10	LISP24	23.5	198.0	SYN	Update	Atypical Speciation (Lotic)
LISP24	2019	December	5.89	10	LISP24	61	273.0	SYN	Update	Atypical Speciation (Lotic)
MI2	2019	September	7.70	1	MI2	8.13	89.3	SYN	Update	Lotic
MI25	2019	September	4.58	3	MI25	0.237	14.2	SYN	Update	Lotic
MI3	2019	September	4.70	3	MI3	1.47	43.3	SYN	Update	Lotic
MI5	2019	September	6.08	3	MI5	2.02	85.7	SYN	Update	Lotic
MICOMP	2019	September	5.50	5	MICOMP	8.39	87.7	SYN	Update	Lotic
MIDAG	2019	September	9.13	3	MIDAG	2.435	69.5	SYN	Update	Lotic
MIDBO	2019	September	6.90	1	MIDBO	9.98	98.0	SYN	Update	Lotic
MIDCO	2019	September	3.07	5	MIDCO	9.17	373.0	SM	Update	Lotic
MIDCO	2019	September	3.13	3	MIDCO	9.17	373.0	SYN	Update	Lotic
MIDER	2019	September	5.49	3	MIDER	1.83	56.0	SYN	Update	Lotic
MIDGA	2019	September	8.20	1	MIDGA	7.85	84.6	SYN	Update	Lotic
MIUCO	2019	September	5.65	3	MIUCO	0.259	17.2	SYN	Update	Lotic
MIULE	2019	September	5.33	3	MIULE	3.12	123.0	SYN	Update	Lotic
MP1	2019	February	5.82	3	MP1	62.5	290.0	SYN	Update	Lotic
MP1	2019	June	5.75	3	MP1	10.8	56.3	SYN	Update	Lotic
MP1	2019	September	6.59	3	MP1	34.4	151.0	SYN	Update	Lotic
MP1	2019	December	5.74	3	MP1	57	226.0	SYN	Update	Lotic
SCDTC	2019	September	9.59	3	SCDTC	9.99	84.7	SYN	Update	Atypical Speciation (Lotic)
SCOUTDS	2019	September	12.42	3	SCOUTDS	32.9	161.0	SYN	Update	Lotic
SCOUTDS	2019	December	6.99	3	SCOUTDS	129	442.0	SYN	Update	Lotic
SLINE	2019	January	3.94	10	SLINE	1.75	81.7	SYN	Update	Lotic
SLINE	2019	February	4.88	10	SLINE	1.7	89.4	SYN	Update	Lotic
SLINE	2019	April	5.83	10	SLINE	1.01	37.6	SYN	Update	Lotic
SLINE	2019	May	5.87	10	SLINE	0.748	21.3	SYN	Update	Lotic
SLINE	2019	June	6.01	10	SLINE	0.656	14.7	SYN	Update	Lotic
SLINE	2019	July	5.64	10	SLINE	0.865	26.8	SYN	Update	Lotic
SLINE	2019	August	5.94	10	SLINE	1.3	43.1	SYN	Update	Lotic
SLINE	2019	September	5.05	10	SLINE	1.37	53.5	SYN	Update	Lotic
SLINE	2019	December	2.65	10	SLINE	1.46	71.5	SYN	Update	Lotic
SPDC	2019	March	45.31	4	SPDC	18.5	81.1	SYN	Update	Atypical Speciation (Lotic)
UCWER	2019	September	8.73	3	UCWER	2.93	51.9	SYN	Update	Lotic
WWRL	2019	September	7.65	3	WWRL	0.407	<0.3	SYN	Update	Lotic
WWRL	2019	September	6.76	3	WWRL	0.407	<0.3	SM	Update	Lotic
DC3	2019	February	6.71	3	DC3	19.1	79.2	SYN	Update	Atypical Speciation (Lotic)
DC3	2019	May	7.45	3	DC3	13.3	40.8	SYN	Update	Atypical Speciation (Lotic)
DC3	2019	June	5.01	5	DC3	16.7	51.5	SYN	Update	Atypical Speciation (Lotic)
DC3	2019	September	6.46	5	DC3	45.9	132.0	SYN	Update	Atypical Speciation (Lotic)
DC3	2019	December	6.20	5	DC3	49.7	142.0	SYN	Update	Atypical Speciation (Lotic)
DCEF	2019	February	6.02	5	DCEF	1.39	5.9	SYN	Update	Lotic
DCEF	2019	May	4.53	3	DCEF	1.67	5.9	SYN	Update	Lotic
DCEF	2019	June	4.28	5	DCEF	1.76	7.4	SYN	Update	Lotic
DCEF	2019	September	6.71	5	DCEF	1.63	7.0	SYN	Update	Lotic
DCEF	2019	December	4.59	5	DCEF	1.41	7.0	SYN	Update	Lotic
DCDS	2018	December	49.92	5	DCDS	23.9	95.1	SYN	Update	Atypical Speciation (Lotic)
SPDC	2019	June	20.82	5	SPDC	19.8	63.0	SYN	Update	Atypical Speciation (Lotic)
SPDC	2019	September	11.39	5	SPDC	41.6	121.0	SYN	Update	Atypical Speciation (Lotic)
SPDC	2019	December	15.69	5	SPDC	50.1	143.0	SYN	Update	Atypical Speciation (Lotic)
DC2	2019	May	16.50	3	DC2	7.71	23.9	SYN	Update	Atypical Speciation (Lotic)
DC2	2019	June	8.55	5	DC2	9.48	31.2	SYN	Update	Atypical Speciation (Lotic)
DC2	2019	September	11.57	5	DC2	31.3	93.8	SYN	Update	Atypical Speciation (Lotic)
DC2	2019	December	9.05	5	DC2	41.3	120.0	SYN	Update	Atypical Speciation (Lotic)
DC4	2019	February	10.44	5	DC4	8.21	32.6	SYN	Update	Atypical Speciation (Lotic)
DC4	2019	May	8.10	3	DC4	7.87	24.1	SYN	Update	Atypical Speciation (Lotic)
DC4	2019	June	8.17	5	DC4	8.5	28.3	SYN	Update	Atypical Speciation (Lotic)
DC4	2019	September	8.83	5	DC4	18	55.8	SYN	Update	Atypical Speciation (Lotic)
DC4	2019	December	7.03	5	DC4	15	47.6	SYN	Update	Atypical Speciation (Lotic)
ERCKUT	2019	September	5.02	3	ERCKUT	149	738.0	SYN	Update	Lotic
ERCKDT	2019	September	7.39	3	ERCKDT	150	690.0	SYN	Update	Lotic
UFR1	2019	February	4.59	3	UFR1	1.02	49.9	SYN	Update	Lotic
UFR1	2019	December	4.46	3	UFR1	0.823	44.7	SYN	Update	Lotic
CLODE	2018	September	13.00	1	CLODE	145	473.0	SYN	Update	Atypical Speciation (Lotic)
DC1	2018	November	10.15	5	DC1	7.54	30.5	SYN	Update	Atypical Speciation (Lotic)
DC3	2018	November	8.12	5	DC3	23	93.7	SYN	Update	Atypical Speciation (Lotic)
BOCK	2015	September	71.20	1	BOCK	131	765.0	SYN	Update	Atypical Speciation (Lotic)
DCEF	2018	November	4.84	5	DCEF	1.24	6.4	SYN	Update	Lotic
ER1A	2017	September	5.92	3	ER1A	0.594	17.0	SM	Update	Lotic

Table A-1

Compiled Lotic Dataset for Paired Invertebrate Tissue Selenium and Aqueous Selenium and Sulphate Concentrations

Invertebrate Monitoring Station	Year	Month	Invertebrate Tissue Selenium (mg/kg dw)	N of Invertebrate Tissue Samples	Water Monitoring Station	Aqueous Selenium (ug/L)	Aqueous Sulphate (mg/L)	EVWQP Pairing Code	Dataset	Speciation
BOCK	2019	September	78.00	1	BOCK	162	1000.0	SYN	Update	Atypical Speciation (Lotic)
FO22	2018	December	4.20	3	FO22	94.4	324.0	SYN	Update	Lotic
FO23	2018	April	8.60	10	FO23	33.9	141.0	SYN	Update	Lotic
FO23	2018	May	7.58	10	FO23	23.9	87.7	SYN	Update	Lotic
FO23	2018	December	9.72	10	FO23	40.2	205.0	SYN	Update	Lotic
FOBCP	2018	December	13.19	3	FOBCP	603	1880.0	SYN	Update	Lotic
FOBKS	2018	December	4.57	3	FOBKS	49.4	256.0	SYN	Update	Lotic
DCDS	2019	February	59.73	5	DCDS	19.1	83.3	SYN	Update	Atypical Speciation (Lotic)
FODHE	2018	December	6.08	3	FODHE	25.1	143.0	SYN	Update	Lotic
FODNGD	2018	December	5.17	3	FODNGD	51.8	219.0	SYN	Update	Lotic
DCDS	2018	September	68.16	3	DCDS	24.9	86.5	SYN	Update	Atypical Speciation (Lotic)
FOUEW	2018	December	4.99	3	FOUEW	86.6	302.0	SYN	Update	Lotic
FOUKI	2018	December	5.79	3	FOUKI	47.4	250.0	SYN	Update	Lotic
FOUNGD	2018	December	5.68	3	FOUNGD	52.2	209.0	SYN	Update	Lotic
FOUSH	2018	December	5.23	3	FOUSH	57.1	252.0	SYN	Update	Lotic
FRUL	2018	May	7.98	10	FRUL	36.3	154.0	SYN	Update	Lotic
FRUL	2018	December	9.71	10	FRUL	49.1	210.0	SYN	Update	Lotic
FRUPO	2018	December	5.13	3	FRUPO	68.7	262.0	SYN	Update	Lotic
KICK	2018	September	6.60	1	KICK	164	441.0	SYN	Update	Lotic
LCUT	2018	May	7.57	10	LCUT	34.8	170.0	SYN	Update	Lotic
LCUT	2018	May	7.41	10	LCUT	16.65	93.0	SYN	Update	Lotic
LCUT	2018	December	6.34	10	LCUT	43.6	286.0	SYN	Update	Lotic
LI24	2018	May	12.98	10	LI24	2.08	31.6	SYN	Update	Lotic
LI24	2018	December	5.43	10	LI24	3.37	86.0	SYN	Update	Lotic
LI8	2018	May	11.77	10	LI8	34.3	150.0	SYN	Update	Atypical Speciation (Lotic)
LI8	2018	May	8.46	10	LI8	16.3	82.2	SYN	Update	Atypical Speciation (Lotic)
LI8	2018	December	7.16	10	LI8	26.2	220.0	SYN	Update	Atypical Speciation (Lotic)
LIDCOM	2018	May	9.11	10	LIDCOM	17.06667	84.6	SM	Update	Atypical Speciation (Lotic)
LIDCOM	2018	May	9.23	10	LIDCOM	17.06667	84.6	SYN	Update	Atypical Speciation (Lotic)
LIDCOM	2018	December	7.33	10	LIDCOM	30.1	242.0	SYN	Update	Atypical Speciation (Lotic)
LIDSL	2018	April	9.49	10	LIDSL	44.8	175.0	SYN	Update	Atypical Speciation (Lotic)
LIDSL	2018	May	9.18	10	LIDSL	19.15	89.1	SYN	Update	Atypical Speciation (Lotic)
LIDSL	2018	December	6.70	10	LIDSL	31.45	263.0	SYN	Update	Atypical Speciation (Lotic)
LILC3	2018	May	18.01	10	LILC3	51.3	208.0	SYN	Update	Atypical Speciation (Lotic)
LILC3	2018	May	14.88	10	LILC3	39.6	155.0	SYN	Update	Atypical Speciation (Lotic)
LILC3	2018	December	8.17	10	LILC3	33.7	337.0	SYN	Update	Atypical Speciation (Lotic)
LISP24	2018	May	9.99	10	LISP24	38.2	167.0	SYN	Update	Atypical Speciation (Lotic)
LISP24	2018	May	8.84	10	LISP24	20.3	96.5	SYN	Update	Atypical Speciation (Lotic)
LISP24	2018	December	6.69	10	LISP24	27.8	280.0	SYN	Update	Atypical Speciation (Lotic)
MP1	2018	December	6.20	3	MP1	57	249.0	SYN	Update	Lotic
SCDTC	2018	September	11.32	3	SCDTC	23.8	151.0	SYN	Update	Atypical Speciation (Lotic)
SLINE	2018	April	5.50	10	SLINE	0.764	23.0	SYN	Update	Lotic
SLINE	2018	December	4.16	10	SLINE	1.5	72.9	SYN	Update	Lotic
UFR1	2018	December	3.93	3	UFR1	0.732	45.2	SYN	Update	Lotic

Notes: "-" = not available; ">" = below the laboratory detection limit; mg/kg dw = milligrams per kilogram dry weight;

mg/L = milligrams per litre; ug/L = micrograms per litre

EVWQP = Elk Valley Water Quality Plan

Table A-1

Compiled Lotic Dataset for Paired Invertebrate Tissue Selenium and Aqueous Selenium and Sulphate Concentrations

Invertebrate Monitoring Station	Year	Month	Invertebrate Tissue Selenium (mg/kg dw)	N of Invertebrate Tissue Samples	Water Monitoring Station	Aqueous Selenium (ug/L)	Aqueous Sulphate (mg/L)	EVWQP Pairing Code	Dataset	ORP (mV)	Aqueous TOC (mg/L)	DO (mg/L)	DO (%)
ALE1	2018	August	4.60	1	ALE1	0.783	25	SYN	Update	394	1.22	6.55	59.5
ALE1	2019	July	13.20	3	ALE1	0.601	24.1	SYN	Update	440	1.2	7.15	66.1
ALE1	2019	September	8.77	3	ALE1	0.702	25.5	SYN	Update	321	1.2	5.65	42.5
ALEI	2018	August	13.04	2	ALEI	0.783	25	SYN	Update	394	1.22	6.55	59.5
AQU1	2018	August	16.94	3	AQU1	6.57	82	SYN	Update	331	3.47	7.085	70.5
AQU1	2019	July	27.22	3	AQU1	6.45	92.5	SYN	Update	450	3.1	9.13	85.6
AQU1	2019	May	21.50	3	AQU1	9.14	101	SYN	Update	376	2.1	6.86	63.5
AQU1	2019	September	14.28	2	AQU1	6.83	107	SYN	Update	328	1.7	9.35	91.4
BA6	2006	August	3.27	1	BA6	<1	5.1	SYN	EVWQP	-	2.9	-	-
BOPDE	2012	September	9.34	2	BOPDE	449	992.5	GeoSYN	EVWQP	-	2.4	10.5	88.6
CUPO	2018	May	3.35	2	CUPO	0.484	10.2	SYN	Update	256	4.15	14	126
DOMRS	2019	May	7.57	3	DOMRS	1.88	23.9	SM	Update	437	0.95	9.72	92
DOMRS	2019	September	9.07	3	DOMRS	0.466	18.8	SYN	Update	430	2.9	6.62	68.6
EL14	2006	August	4.41	1	EL14	<1	2.6	SYN	EVWQP	-	0.6	-	-
EL14	2009	June	6.40	1	EL14	0.41	-	SYN	EVWQP	-	-	12.04	112.3
EL14	2015	September	2.27	3	EL14	0.3128628	4.13	GeoSYN	Update	-	0.5	8.3810241	81.844897
EL14O	2012	September	3.55	3	EL14O	0.26	4	GeoSYN	EVWQP	-	0.65	9.5	88
EL18	2006	August	4.30	1	EL18	<1	21.4	SYN	EVWQP	-	2.8	-	-
ELKO	2013	July	9.54	1	ELKO	6.45	39.4	SYN	Update	-	-	-	-
ELKO	2015	September	10.05	3	ELKO	8.9309892	66	GeoSYN	Update	-	0.5867077	8.8713895	87.194604
ELKOL	2012	September	17.45	1	ELKOL	7.89	57.7	SYN	EVWQP	-	1.18	10.1	89.5
ELKOM	2012	September	15.97	1	ELKOM	2.26	37.1	SYN	EVWQP	-	4.42	8.7	85.2
ELKOU	2012	September	8.81	1	ELKOU	0.48	8.51	SYN	EVWQP	-	6.86	4.8	48.2
ELWDGC	2012	September	7.71	1	ELWDGC	1.77	43.9	SYN	EVWQP	-	2.65	12.4	110.8
ELWDGC	2015	September	10.57	3	ELWDGC	3.3515434	51	GeoSYN	Update	-	1.2034236	6.5805625	61.158934
ELWDGC	2018	May	22.63	3	ELWDGC	6.42	69	SYN	Update	268	3.15	9.7	86
ELWDGC	2018	August	24.09	3	ELWDGC	7.31	57	SYN	Update	347	1.61	4.745	49.5
ELWDGC	2019	September	14.29	3	ELWDGC	5.13	57.8	SYN	Update	465	1.4	8.95	91.7
ELWDGC	2019	May	41.08	3	ELWDGC	8.27	83.8	SM	Update	398	1.4	6.92	79
EREV	2019	June	10.73	3	EREV	9.47	64.9	SYN	Update	318	1.4	8.95	81.9
ERH	2018	August	9.37	3	ERH	1.03	13	SYN	Update	317	2.41	8.46	77.5
ERIMF	2018	July	2.73	3	ERIMF	0.091	5.93	SYN	Update	206	3.79	6.71	87
ERIMF	2019	June	3.47	3	ERIMF	0.14	12.6	SYN	Update	455	1.4	8.53	90.3
ERIMNF	2019	June	5.64	3	ERIMNF	0.443	179	SYN	Update	358	8	6.96	57.6
ERMO	2018	May	6.87	3	ERMO	0.607	5.92	SYN	Update	294	1.36	10.065287	98.59006
EROL	2015	September	14.46	3	EROL	3.7888059	36.3	GeoSYN	Update	-	0.5809773	8.419851	81.449526
EROL	2018	August	9.20	2	EROL	0.127	5.46	SYN	Update	324	2.01	6.2489999	58.223707
EROL	2018	August	18.00	1	EROL	0.127	5.46	SYN	Update	324	2.01	6.2489999	58.223707
EROL	2019	May	9.41	3	EROL	1.49	13.4	SYN	Update	442	0.83	8.37	68.4
EROL	2019	June	10.80	3	EROL	2.65	28.4	SYN	Update	427	1.5	10.7	103.1
EROL	2019	September	4.07	3	EROL	0.097	18.8	SYN	Update	387	1.2	5.8638298	59.751402
EROLL	2012	September	3.96	3	EROLL	1.01	14.6	GeoSYN	EVWQP	-	1.09	12	117.1
EROU	2015	September	1.75	3	EROU	0.1930283	3.07	GeoSYN	Update	-	5.9849484	8.3543767	88.996252
EROU	2018	July	2.48	3	EROU	0.253	5.9	SYN	Update	281	12	4.6514514	48.062459
EROU	2018	May	3.33	3	EROU	0.2	34.7	SYN	Update	294	5.48	5.7131427	56.391489
EROU	2019	June	2.54	3	EROU	0.22	18	SYN	Update	335	7.1	5.9	64.3
EROUL	2012	September	2.77	3	EROUL	0.25	10.88	GeoSYN	EVWQP	-	7.27	12.1	116.5
ERSCIM	2019	June	10.18	3	ERSCIM	26.5	149	SYN	Update	364	0.85	9.17	74.1
ERSCMC	2019	May	12.00	3	ERSCMC	9.39	77.2	SYN	Update	446	0.88	9.2	85
ERSCMC	2019	September	9.73	3	ERSCMC	4.36	42.6	SYN	Update	373	1.6	13.39	126
ERST	2018	July	7.22	3	ERST	0.941	25	SYN	Update	318	1.3	4.9839743	51.497573
ERST	2018	May	6.94	3	ERST	3.64	55.9	SYN	Update	271	1.93	7.0044058	62.25753
ERST	2019	May	10.63	3	ERST	1.62	44.5	SYN	Update	413	2.7	7.81	67.9
ERUP	2015	September	4.18	3	ERUP	0.2057835	20.9	GeoSYN	Update	-	2.1370126	9.6340791	103.76444
ERUP	2018	August	5.54	3	ERUP	0.304	21	SYN	Update	335	3.6	10.954451	123.20714
ERUP	2019	May	5.25	3	ERUP	0.298	22.1	SYN	Update	478	2.3	5.86	59.6
ERUP	2019	June	6.44	3	ERUP	0.317	22.4	SYN	Update	414	2.2	5.6	49.5
ERUP	2019	September	3.62	3	ERUP	0.291	21.2	SYN	Update	292	3.4	6.53	60.5
ERW	2018	August	50.70	3	ERW	2.39	41	SYN	Update	440	3.96	4.8802152	52.497619
ERW	2019	June	23.83	3	ERW	9	90.5	SYN	Update	344	3.4	6.07	61.4
ERWCO	2018	May	29.71	3	ERWCO	6.25	62.6	SYN	Update	266	1.85	6.8581339	64.899923
ERWSF	2012	September	3.29	1	ERWSF	0.14	4.26	SYN	EVWQP	-	3.66	11.9	120
ERWSF	2018	July	2.84	3	ERWSF	0.417	6.8	SYN	Update	345	6.39	8.8096538	109.1192
ERWSF	2019	May	4.56	3	ERWSF	0.576	10.1	SYN	Update	426	4.5	16.42	164.2
ERWSF	2019	June	4.70	3	ERWSF	0.514	9.21	SYN	Update	394	6	23.61	-
ERWSF	2019	September	3.52	3	ERWSF	0.445	9.88	SYN	Update	422	3.2	9.2932406	92.180258
EV_AQW	2013	September	22.94	2	EV_AQW	4.62	-	SM	Update	-	-	-	-
EV_ERP2	2013	July	7.34	1	EV_ERP2	1.22	14.2	SYN	Update	-	1.4	7.85	74.6
EV_ERP3	2013	July	14.70	1	EV_ERP3	0.46	9.07	SYN	Update	-	1.1	9.45	79.7
EV_ERP4	2013	July	3.55	1	EV_ERP4	0.31	3.5	SYN	Update	-	2.09	10.69	93
GO13	2009	August	14.37	1	EV_GC2	13.5	121.7	GeoSM	EVWQP	-	-	9.2	-
GO13	2009	May	25.46	1	EV_GC2	11.6	110	SM	EVWQP	-	-	8.01	78.8
EV_GAPD	2013	July	22.10	1	EV_GT1	144	701	SM	Update	-	-	-	-
HA7	2009	June	28.62	1	EV_HC1	20.3	124.8	GeoSM	EVWQP	-	-	7.79	60.9
HA7	2013	September	14.69	2	EV_HC1	37.6	178	SM	Update	-	-	-	-
HA7	2013	July	19.10	1	EV_HC1	27.4	114	SM	Update	-	-	-	-
EVPPS	2018	August	10.48	3	EVPPS	1.03	13	SYN	Update	299	6.23	3.5	40.124805
EVPPS	2019	July	12.60	3	EVPPS	1.89	25.6	SYN	Update	432	3.2	7.52	79
EVPPS	2019	September	11.92	3	EVPPS	1.26	27	SYN	Update	268	2	5.82	57
Fen	2010	August	2.29	5	Fen	<0.5	<0.5	SM	EVWQP	-	-	-	-
FL17	2006	August	3.03	1	FL17	<1	1.5	SYN	EVWQP	-	4	-	-
FL17	2009	May	4.30	1	FL17	0.24	-	SYN	EVWQP	-	-	7.24	72.7
FL17	2012	September	3.91	1	FL17	0.19	0.95	SYN	EVWQP	-	5.08	9	86.5

Table A-1

Compiled Lotic Dataset for Paired Invertebrate Tissue Selenium and Aqueous Selenium and Sulphate Concentrations

Invertebrate Monitoring Station	Year	Month	Invertebrate Tissue Selenium (mg/kg dw)	N of Invertebrate Tissue Samples	Water Monitoring Station	Aqueous Selenium (ug/L)	Aqueous Sulphate (mg/L)	EVWQP Pairing Code	Dataset	ORP (mV)	Aqueous TOC (mg/L)	DO (mg/L)	DO (%)
FL17	2019	May	3.42	3	FL17	0.26	1.21	SYN	Update	390	4.7	8.35	76
FLA1	2015	September	3.44	3	FLA1	0.1557366	1.6	GeoSYN	Update	-	0.6799337	7.1748511	70.156364
FLA1	2019	May	3.40	3	FLA1	0.218	1.63	SYN	Update	454	0.5	5.56	48.6
FLA1	2019	September	2.89	3	FLA1	0.154	1.62	SYN	Update	354	2.4	8.41	91.6
FLOX	2019	September	5.36	3	FLOX	0.11	2.43	SYN	Update	312	1.9	9.81	107
FMUCK	2015	September	12.66	3	FMUCK	73.199954	257	GeoSYN	Update	-	0.6460909	11.084286	96.733447
FO10	2006	August	17.51	1	FO10	13	91.2	SYN	EVWQP	-	1.4	-	-
FO10	2018	July	21.18	3	FO10	8.95	193	SYN	Update	350	5.06	4.2974411	37.788887
FO10L	2012	September	37.46	3	FO10L	17.05	219	GeoSYN	EVWQP	-	0.76	8.3	65.6
FO15	2006	August	2.46	1	FO15	<1	11.2	SYN	EVWQP	-	10.3	-	-
FO15	2009	June	1.76	1	FO15	0.11	-	SYN	EVWQP	-	-	6.81	70.9
FO15	2013	September	3.64	1	FO15	0.16	4.55	SYN	EVWQP	-	9.79	5.77	-
FO15	2018	July	2.59	3	FO15	0.209	5.57	SYN	Update	360	14	5.1583428	61.64414
FO15	2018	May	1.95	3	FO15	0.274	22.6	SYN	Update	269	5.56	6.8437271	60.74537
FO15	2019	June	2.05	3	FO15	0.161	14.2	SYN	Update	454	10	8.5	89.7
FO15B	2012	September	2.62	2	FO15B	0.14	5.99	GeoSYN	EVWQP	-	10.5	6.7	26.1
FO15B	2019	May	1.51	3	FO15B	0.074	19.6	SYN	Update	384.37091	7.9	5.0911688	51.563553
FOFR2	2018	July	2.56	3	FOFR2	0.087	338	SYN	Update	305	2.09	8.2704293	98.954535
FOFR2W	2012	September	4.38	1	FOFR2W	0.3	407	SYN	EVWQP	-	1.23	6.8	59.5
FOFR2W	2018	May	3.75	3	FOFR2W	0.06	363	SYN	Update	291	3.84	6.28	75
FOFR2W	2019	June	3.90	3	FOFR2W	1.97	380	SYN	Update	288	1.9	8.74	92.5
FOXCF	2018	July	1.68	3	FOXCF	<0.5	<0.3	SYN	Update	319	12	6.366027	66.633325
FOXL	2015	September	1.44	3	FOXL	0.2560555	<0.3	GeoSYN	Update	-	9.3741518	2.9526422	27.104145
FOXLL	2012	September	0.89	3	FOXLL	0.18	<0.5	GeoSYN	EVWQP	-	8.48	6.5	51.2
CL11	2013	July	18.00	1	FR_CC1	161.43729	380	GeoSM	Update	-	-	-	-
HE27	2009	May	9.16	1	FR_HC1	6.7	73.9	GeoSM	EVWQP	-	-	9.1154338	67.155659
FRSCW	2019	June	17.77	3	FRSCW	41.4	158	SYN	Update	305	0.85	8.97	78.9
FRSO	2018	May	3.17	3	FRSO	0.108	36.7	SYN	Update	246	9.01	8.1277303	76.544105
FRWUCH	2018	July	5.59	3	FRWUCH	0.638	<0.3	SYN	Update	287	16	7.6013157	88.498588
FSTRC	2018	May	3.38	3	FSTRC	1.16	49.8	SYN	Update	341	3.73	3.5830155	33.226495
FWDEC	2015	September	17.56	3	FWDEC	1.1162438	33.8	GeoSYN	Update	-	0.5	10.063168	83.415882
FWDEC	2018	July	10.97	3	FWDEC	1.26	35	SYN	Update	314	1.04	8.1682311	72.069411
GAPDLg	2012	September	5.37	2	GAPDLg	8.72	23.2	GeoSYN	EVWQP	-	2.72	13	125.7
GAPD-SM	2012	September	2.24	1	GAPD-SM	0.29	<0.5	SYN	Update	-	10.2	21	204
GARD	2019	May	1.65	3	GARD	0.11	10.9	SYN	Update	335	10	6.43	64.7
GHPD	2013	July	11.30	1	GH_GH1	72.5	318	SM	Update	-	-	-	-
FO10	2009	May	51.19	1	GH_PC2	41.3	-	GeoSYN	EVWQP	-	-	9.9214213	83.71547
FO10	2009	August	47.33	1	GH_PC2	23.6	-	SM	EVWQP	-	-	-	-
THPD	2013	July	20.10	1	GH_TC2	98.1	427	SM	Update	-	-	-	-
GHPD	2012	September	14.99	1	GHPD	174	761	SYN	EVWQP	-	2.28	12.3	128
GHSCW	2018	July	8.95	3	GHSCW	0.681	17	SYN	Update	278	1.52	9.1433036	87.612784
GHWTC	2018	August	1.56	3	GHWTC	0.116	27	AdjM	Update	255	10	6.31	82
GLM	2013	September	0.42	1	GLM	<0.1	<0.5	SYN	EVWQP	-	22.9	4	-
GLML	2018	May	1.64	3	GLML	0.183	2.1	SYN	Update	243	13	4.0649723	37.735925
GLMLg	2012	September	0.78	2	GLMLg	0.11	0.57	GeoSYN	EVWQP	-	16.7	0.8	6.6
GLMS	2018	August	0.50	1	GLMS	0.185	<1.5	SYN	Update	209	38	1.39	14
GLMS	2018	August	0.71	2	GLMS	0.185	<1.5	SYN	Update	209	38	1.39	14
GLMS	2018	May	1.62	3	GLMS	0.409	4.2	SYN	Update	233	18	3.77	34
GLMS	2019	May	0.57	3	GLMS	0.132	<0.3	SYN	Update	430	26	4.06	40.4
GLMS	2019	June	0.81	3	GLMS	0.197	0.39	SYN	Update	380	6.3	5.1	52.7
GO13	2006	August	21.22	1	GO13	82.5	323	SYN	EVWQP	-	1	-	-
GO13	2015	September	36.00	3	GO13	35.974138	327	GeoSYN	Update	-	0.7816418	8.621869	85.636112
GO13	2018	July	16.42	3	GO13	0.405	250	SYN	Update	297	5.17	5.7592708	66.932802
GO13	2019	June	16.68	3	GO13	0.427	178	SYN	Update	383	5.9	1.05	10
GO13	2019	May	28.51	3	GO13	67.1	342	SM	Update	457	3.5	5.85	53.7
GO13	2019	July	20.25	6	GO13	4.0911612	260.27485	GeoSYN	Update	323.91357	3.5312887	2.3783187	23.698101
GO13	2019	September	19.07	3	GO13	68.1	332	SYN	Update	252	2.2	8.3097052	87.997955
GO13L	2012	September	34.43	3	GO13L	33.2	248	GeoSYN	EVWQP	-	4.59	10.9	95.6
GO13	2013	October	19.76	2	GOD1-L	26.4	-	AdjM	Update	-	-	-	-
GRLK	2018	August	3.73	3	GRLK	0.32	21	SYN	Update	359	2.8	8.8	95
GRLK	2018	May	3.17	2	GRLK	0.183	18.4	SYN	Update	241	7.16	5.8481279	49.959984
GRLK	2019	June	5.61	3	GRLK	0.311	21.7	SYN	Update	442	1.6	7.59	72.6
HA7	2006	July	22.41	1	HA7	27	155	SYN	EVWQP	-	0.8	-	-
HA7I	2012	September	19.59	2	HA7I	31.6	172	GeoSYN	EVWQP	-	1.64	9.7	81.1
HAPD	2016	September	28.15	3	HAPD	33.976114	194	GeoSYN	Update	-	-	-	-
HART	2018	August	10.26	3	HART	0.414	36	SYN	Update	437	3.23	14	138
HART	2019	May	3.93	3	HART	0.403	40	SYN	Update	514	-	1.89	15.4
HART	2019	June	6.17	3	HART	0.571	44.1	SM	Update	305	2.5	13.93	146.4
HE27	2012	September	10.46	1	HE27	26.1	118	SYN	EVWQP	-	0.79	8.9	70.4
HE27	2015	September	10.04	3	HE27	17.264281	105	GeoSYN	Update	-	0.5065797	8.7458807	75.677495
HE27	2017	September	11.70	1	HE27	-	-	-	Update	-	-	-	-
HE27	2018	July	15.58	3	HE27	16	89	SYN	Update	370	0.95	10.440785	104.47009
HE27	2019	June	8.18	3	HE27	4.77	35.6	SYN	Update	325	1.1	11.63	92.4
KSPS	2012	September	34.83	1	KSPS	111	312	SYN	EVWQP	-	0.83	5.7	55.7
ELKO U/S	2010	May	13.46	5	LC_ElkoRes	6.2613398	56.7	PostAnnGeo	EVWQP	-	-	-	-
FORP	2010	May	8.99	5	LC_FRDSDC	32.9	-	SM	EVWQP	-	-	-	-
MSAN	2013	July	6.60	1	LC_LC7	7.94	47.3	SM	Update	-	-	-	-
LCCPL	2013	July	36.00	1	LC_LC8	31.5	-	SM	Update	-	-	-	-
LCCPL	2014	July	42.00	1	LC_LC8	37.8	-	SM	Update	-	-	-	-
NNP	2013	July	7.08	1	LC_LC9	8.89	107	SM	Update	-	-	-	-
LCCPU/L	2019	May	55.54	3	LCCPU/L	29.8	187	SYN	Update	442	1.4	-	-
LCHO	2015	September	14.68	3	LCHO	0.7277685	4.69	GeoSYN	Update	-	0.6630688	4.9389638	44.265373
LCHOB	2019	May	1.60	3	LCHOB	0.122	0.43	SYN	Update	463	-	8.42	88.7

Table A-1

Compiled Lotic Dataset for Paired Invertebrate Tissue Selenium and Aqueous Selenium and Sulphate Concentrations

Invertebrate Monitoring Station	Year	Month	Invertebrate Tissue Selenium (mg/kg dw)	N of Invertebrate Tissue Samples	Water Monitoring Station	Aqueous Selenium (ug/L)	Aqueous Sulphate (mg/L)	EVWQP Pairing Code	Dataset	ORP (mV)	Aqueous TOC (mg/L)	DO (mg/L)	DO (%)
LFSRW	2019	May	4.97	3	LFSRW	0.133	0.57	SYN	Update	483	10	-	79.4
LFSRW	2019	June	4.50	3	LFSRW	0.277	2.26	SM	Update	284	10	7.14	70.7
LFSRW	2019	July	3.30	3	LFSRW	0.21	5.76	SYN	Update	423	7.4	7.95	75.9
LFSRW	2019	September	2.95	3	LFSRW	0.231	21.1	SYN	Update	364	2.6	7.63	78.72
LK01	2009	October	2.35	5	LK01	0.6	27.2	GeoAdjM	EVWQP	-	-	-	-
LK02	2009	October	6.41	5	LK02	1.74	30.7	GeoAdjM	EVWQP	-	-	-	-
LK02	2010	May	4.04	5	LK02	1.74	30.7	PrevAnnGeo	EVWQP	-	-	-	-
LK02	2013	July	7.43	1	LK02	5.3	33.4	SYN	Update	-	-	-	-
LkMtn2	2010	August	6.86	5	LkMtn2	<0.5	3.86	SM	EVWQP	-	-	-	-
LML	2015	September	4.65	3	LML	0.2895217	2.22	GeoSYN	Update	-	7.0485509	8.8419754	91.348131
LML	2018	May	7.17	3	LML	0.228	3.5	SYN	Update	242	12	4.18	39
LPLML	2018	July	17.59	3	LPLML	2.67	144	SYN	Update	272	11	12	160
LPLML	2019	June	17.15	3	LPLML	1.77	164	SYN	Update	265	7.1	10.9	111.8
MCIMCC	2019	May	11.25	3	MCIMCC	17.8	488	SYN	Update	414	0.78	8.14	71.8
MCIMCC	2019	September	3.31	3	MCIMCC	3.67	470	SYN	Update	446	1.8	12.448467	131.6866
MCUP	2018	May	11.48	3	MCUP	1.34	42	SYN	Update	293	2.99	10.660206	85.322916
MCWA	2019	July	5.53	3	MCWA	5.15	328	SYN	Update	429	1.8	6.01	56
MCWA	2019	September	4.78	3	MCWA	6.44	403	SYN	Update	515	1.5	9.29	99.4
MI16	2006	August	5.10	1	MI16	<1	72.9	SYN	EVWQP	-	1.7	-	-
MI16	2009	May	7.73	1	MI16	2.07	-	SYN	EVWQP	-	-	8.41	66.2
MI16	2015	September	18.94	3	MI16	1.7028924	105	GeoSYN	Update	-	1.6153226	11.110785	104.87667
MI16	2018	August	10.35	3	MI16	1.89	133	SYN	Update	396	3.68	12.553884	132.21195
MI16	2019	June	9.78	3	MI16	1.43	42.4	SYN	Update	375	2.8	-	-
MI16L	2012	September	8.99	3	MI16L	0.62	21.3	GeoSYN	EVWQP	-	1.19	6.5	52.7
MIC2	2015	September	9.94	3	MIC2	1.676172	72.8	GeoSYN	Update	-	1.0300236	6.7022543	64.5487
MIC2	2019	September	6.64	3	MIC2	1.46	80.6	SYN	Update	286	2	6.51	71.6
MIWW	2012	September	6.43	1	MIWW	0.765	54.8	SYN	EVWQP	-	1.42	7.3	62
MIWW	2015	September	12.53	3	MIWW	0.9613948	43.6	GeoSYN	Update	-	0.7545642	6.5524429	59.134277
MIWW	2018	August	12.39	3	MIWW	1.26	57	SYN	Update	406	0.95	9.9075729	102.16164
MIWW	2019	May	14.52	3	MIWW	1.5	62	SYN	Update	419	-	9.23	73.7
MIWW	2019	June	13.33	3	MIWW	1.13	40.3	SYN	Update	434	1.7	9.48	92.7
MIWW	2019	September	6.11	2	MIWW	0.847	52.3	SYN	Update	390	1.9	9.2660671	103.11886
MCW	2013	September	13.57	2	MW_MCW	1.5	14.6	SM	Update	-	-	-	-
MIW1	2013	September	3.72	2	MW_MW1	0.75	32.8	AdjM	Update	-	-	-	-
MIW2	2013	September	5.59	2	MW_MW2	1.6	47.7	AdjM	Update	-	-	-	-
MIW3	2013	September	7.35	6	MW_MW3	0.58	4.91	AdjM	Update	-	-	-	-
MIW4	2013	September	10.40	1	MW_MW4	0.61	-	AdjM	Update	-	-	-	-
NAYDAY	2018	May	1.85	3	NAYDAY	0.153	0.9	SYN	Update	295	13	6.6740093	60.991803
EV_OCW	2013	September	8.07	2	OTT2-L	0.73	-	SM	Update	-	-	-	-
OTTO	2015	September	6.94	3	OTTO	0.4415236	47.7	GeoSYN	Update	-	1.3966322	7.2667011	76.937447
OTTO	2018	July	6.84	3	OTTO	1.64	60	SYN	Update	324	4.22	5.58	66
OTTO	2018	May	14.98	3	OTTO	4.08	70.1	SYN	Update	262	5.21	6.5	63
OTTO	2019	May	6.59	3	OTTO	0.508	85.5	SYN	Update	341	2.4	7.77	75.6
OTTO	2019	June	4.60	3	OTTO	0.543	68.7	SYN	Update	429	4.4	5.33	56.9
OTTO	2019	September	2.30	3	OTTO	0.244	25.9	SYN	Update	244	2.7	6.7813642	72.446463
OTTOL	2012	September	15.70	3	OTTOL	4.48	81.2	GeoSYN	EVWQP	-	1.14	8.5	77.2
PAIR	2019	July	22.45	3	PAIR	9.76	65.7	SYN	Update	448	0.61	7.69	64.1
PAIR	2019	September	16.47	3	PAIR	9.25	58.9	SYN	Update	313	1.2	10.09	83.8
PWP	2018	May	4.89	3	PWP	0.14	18.2	SYN	Update	250	23	4.45	44
R115	2013	September	4.58	1	R115	8.19	58.5	SYN	EVWQP	-	1.55	9.58	-
R118	2013	September	10.40	2	R118	7.87	57.9	SYN	EVWQP	-	1.2	5.16	-
R12	2013	September	1.76	1	R12	<0.1	6.35	SYN	EVWQP	-	0.86	7.6	-
R120	2013	September	4.73	1	R120	0.23	4.86	SYN	EVWQP	-	2.72	5.4	-
R129	2013	September	3.15	1	R129	7.75	58.4	SYN	EVWQP	-	0.94	3.96	-
R144	2013	September	4.93	1	R144	1.04	20.8	SYN	EVWQP	-	4.43	13.33	-
R144	2018	May	6.36	3	R144	1.99	23.6	SYN	Update	266	0.81	10.682696	98.59006
R161	2013	September	3.57	1	R161	0.2	3.42	SYN	EVWQP	-	2.35	4.31	-
R176	2013	September	5.70	1	R176	0.14	4.33	SYN	EVWQP	-	2.53	5.06	-
R2101	2013	September	3.38	1	R2101	0.15	22.7	SYN	EVWQP	-	1.94	3.91	-
R2108	2013	September	13.64	2	R2108	0.81	23	GeoSYN	EVWQP	-	2.53	7.48	-
R2110	2013	September	8.25	1	R2110	6.33	51.7	SYN	EVWQP	-	1	2.85	-
R2113	2013	September	4.15	1	R2113	7.5	61.2	SYN	EVWQP	-	1.82	5.65	-
R2122A	2013	September	2.82	1	R2122A	4.73	45.1	SYN	EVWQP	-	0.83	1.1	-
R2122B	2013	September	8.66	1	R2122B	3.46	41.5	SYN	EVWQP	-	1.04	2.3	-
R2124	2013	September	8.29	1	R2124	9.01	62.2	SYN	EVWQP	-	0.97	6.02	-
R280A	2013	September	6.01	1	R280A	0.11	15.4	SYN	EVWQP	-	1.66	2.3	-
R292	2013	September	2.48	1	R292	0.38	393	SYN	EVWQP	-	2.37	9.95	-
R3127	2013	September	2.71	1	R3127	1.03	23.4	SYN	EVWQP	-	0.5	5.33	-
R3129	2013	September	8.31	1	R3129	2.48	35.3	SYN	EVWQP	-	3.56	9.41	-
R3137	2013	September	1.14	1	R3137	7.65	58.6	SYN	EVWQP	-	1.1	5.74	-
R3138	2013	September	6.52	2	R3138	1.83	33.3	SYN	EVWQP	-	3.68	9.58	-
R3138	2018	May	15.33	3	R3138	4.58	69.5	SYN	Update	292	6.71	3.9884207	34.641016
R3139	2013	September	13.00	1	R3139	5.46	48.4	SYN	EVWQP	-	2.45	6.2	-
R3145	2013	September	15.20	1	R3145	1.93	74.1	SYN	EVWQP	-	3.66	5.52	-
R3153	2013	September	12.30	1	R3153	11.8	65	SYN	EVWQP	-	0.79	6.55	-
R3157	2013	September	6.07	1	R3157	20.2	129	SYN	EVWQP	-	1.15	7.57	-
R4159	2013	September	3.29	1	R4159	0.2	6.55	SYN	EVWQP	-	3.41	6.24	-
R4160	2013	September	4.86	1	R4160	1.18	24.5	SYN	EVWQP	-	3.56	5.44	-
R4161	2013	September	2.81	1	R4161	0.28	9.69	SYN	EVWQP	-	6.18	7.2	-
R4162	2013	September	6.56	1	R4162	0.65	24.7	SYN	EVWQP	-	0.5	2.94	-
R4163	2013	September	4.96	1	R4163	0.2	16.4	SYN	EVWQP	-	1.53	6.08	-
R4164	2013	September	2.23	1	R4164	0.32	23.5	SYN	EVWQP	-	2.46	7.1	-
R4165	2013	September	2.96	1	R4165	0.5	15.2	SYN	EVWQP	-	1.36	9.36	-

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Invertebrate Monitoring Station	Year	Month	Invertebrate Tissue Selenium (mg/kg dw)	N of Invertebrate Tissue Samples	Water Monitoring Station	Aqueous Selenium (ug/L)	Aqueous Sulphate (mg/L)	EVWQP Pairing Code	Dataset	ORP (mV)	Aqueous TOC (mg/L)	DO (mg/L)	DO (%)
R51	2013	September	35.00	1	R51	3.75	288	SYN	EVWQP	-	6.59	5.1	-
R5-1	2015	September	28.20	3	R5-1	4.6788985	397	GeoSYN	Update	-	12.946526	6.6267668	65.597697
R510	2013	September	9.60	2	R510	36.6	132	SYN	EVWQP	-	0.97	4.96	-
R517	2013	September	14.50	1	R517	21.2	109	SYN	EVWQP	-	8.04	8.38	-
R52	2013	September	3.15	1	R52	0.15	9.39	SYN	EVWQP	-	6.42	2.38	-
R53	2013	September	22.30	1	R53	28.4	136	SYN	EVWQP	-	2.12	7.21	-
R53	2015	September	20.37	3	R53	27.588396	128	GeoSYN	Update	-	0.5	10.683395	92.550334
R54	2013	September	11.70	1	R54	19.9	105	SYN	EVWQP	-	1.31	5.34	-
R55	2013	September	9.97	1	R55	7.94	68.4	SYN	EVWQP	-	1.42	6.35	-
R59	2013	September	8.18	1	R59	47.3	152	SYN	EVWQP	-	0.93	5.86	-
R612	2013	September	7.99	1	R612	40.6	162	SYN	EVWQP	-	2.92	4.22	-
R614	2013	September	23.00	1	R614	38.1	146	SYN	EVWQP	-	1.49	4.55	-
R615A	2013	September	3.48	1	R615A	0.24	7.33	SYN	EVWQP	-	6.11	5.43	-
R615B	2013	September	7.97	1	R615B	0.18	14.7	SYN	EVWQP	-	2.69	5.47	-
R62	2013	September	31.30	1	R62	59.9	538	SYN	EVWQP	-	6.16	6.6	-
R635	2013	September	25.20	1	R635	1.68	211	SYN	EVWQP	-	1.12	3.12	-
R636	2013	September	5.78	1	R636	61.7	199	SYN	EVWQP	-	1.32	6.49	-
R636	2013	September	5.18	1	R636	53.5	199	SYN	EVWQP	-	1.32	6.49	-
R644	2013	September	20.50	1	R644	22	87.1	SYN	EVWQP	-	1.65	5.23	-
R651	2018	May	3.07	3	R651	0.731	4.05	SYN	Update	334	6.91	8.2619247	63.968742
R7109	2013	September	9.83	1	R7109	14.3	89.7	SYN	EVWQP	-	2.04	10.7	-
R7114A	2013	September	9.06	1	R7114A	26.6	116	SYN	EVWQP	-	0.88	9	-
R7114B	2013	September	7.36	1	R7114B	102	288	SYN	EVWQP	-	0.97	11.4	-
R747	2013	September	1.15	1	R747	0.53	<0.5	SYN	EVWQP	-	13.5	5.4	-
R748	2013	September	1.48	1	R748	0.35	<0.5	SYN	EVWQP	-	10.6	5.2	-
R749	2013	September	4.24	1	R749	0.36	0.88	SYN	EVWQP	-	10.4	4.4	-
R751	2013	September	2.42	1	R751	0.55	<0.5	SYN	EVWQP	-	20.7	10.26	-
R764	2013	September	8.31	1	R764	65.4	255	SYN	EVWQP	-	0.71	7.62	-
REFF	2012	September	6.53	1	REFF	0.4	6.76	SYN	EVWQP	-	4.15	9.7	96.7
REFF	2013	September	6.08	1	REFF	0.37	6.24	SYN	EVWQP	-	3.93	3.42	-
REFF	2015	September	5.49	3	REFF	0.4686031	9.53	GeoSYN	Update	-	3.3393663	7.8307526	85.549466
REFF	2018	May	5.94	3	REFF	0.344	6.56	SYN	Update	261	6.72	5.0655207	47.116876
ELKO	2009	October	6.92	5	RG_ELKORES	6.49	57.7	SM	EVWQP	-	-	-	-
T4	2014	April	6.18	1	G_GRASMER	2.0197669	41	GeoSM	Update	-	-	-	-
T4	2014	August	7.50	1	G_GRASMER	0.9248784	20.5	GeoSM	Update	-	-	-	-
T4	2014	August	2.68	6	G_GRASMER	0.9248784	20.5	GeoSM	Update	-	-	-	-
T4	2015	April	5.29	1	G_GRASMER	1.75	33.1	GeoSM	Update	-	-	-	-
T4	2015	August	6.96	1	G_GRASMER	1.1	21.6	GeoSM	Update	-	-	-	-
T4	2015	August	5.84	5	G_GRASMER	1.1	21.6	GeoSM	Update	-	-	-	-
T4	2016	April	9.71	1	G_GRASMER	1.06	26.6	GeoSM	Update	-	-	-	-
T4	2016	August	6.03	1	G_GRASMER	1	22.8	GeoSM	Update	-	-	-	-
T4	2016	August	3.22	5	G_GRASMER	1	22.8	GeoSM	Update	-	-	-	-
TN	2015	August	1.98	1	RG_KERRRD	0.53	23.2	GeoSM	Update	-	-	-	-
TN	2015	August	7.16	5	RG_KERRRD	0.53	23.2	GeoSM	Update	-	-	-	-
TN	2016	April	7.80	1	RG_KERRRD	0.11	17.1	GeoAdjM	Update	-	-	-	-
TN	2016	August	5.48	1	RG_KERRRD	0.13	23.2	GeoSM	Update	-	-	-	-
TN	2016	August	2.84	5	RG_KERRRD	0.13	23.2	GeoSM	Update	-	-	-	-
T2	2014	April	4.69	1	RG_USELK	0.24	36.6	GeoSM	Update	-	-	-	-
T2	2014	August	4.19	1	RG_USELK	1.1976644	22.9	GeoSM	Update	-	-	-	-
T2	2014	August	2.49	5	RG_USELK	1.1976644	22.9	GeoSM	Update	-	-	-	-
T2	2015	April	5.85	1	RG_USELK	0.8	30.9	GeoSM	Update	-	-	-	-
RL1	2009	June	3.63	1	RL1	0.21	-	SYN	EVWQP	-	-	11.4	98.5
SEROX	2018	May	11.03	3	SEROX	0.859	40	SYN	Update	271	1.84	13	127
SEROX	2019	June	11.60	3	SEROX	1.96	29.3	SYN	Update	327	0.68	8.55	81.4
SEROX	2019	July	9.87	3	SEROX	0.751	20.7	SYN	Update	434	2.4	7.44	74.6
SEROX	2019	September	5.70	3	SEROX	1.44	34.6	SYN	Update	278	0.5	10.26	110.05
EV_SMCW	2013	September	5.69	1	SIX1-L	1.9	-	SM	Update	-	-	-	-
SMCIM	2018	August	6.26	3	SMCIM	0.158	18	SYN	Update	402	2.45	7.6893498	83.024093
SMCIM	2019	May	12.32	3	SMCIM	0.31	20.3	SYN	Update	356	1.3	7.07	58.5
SMCIM	2019	July	7.48	3	SMCIM	0.27	16	SYN	Update	422	2.2	8.52	81.5
SMCIM	2019	September	4.47	3	SMCIM	0.224	20.1	SYN	Update	435	2	8.8	89.6
STPD	2015	September	21.46	3	STPD	3.4449757	32.4	GeoSYN	Update	-	1.1376127	10.764317	112.27561
STPD	2018	July	13.90	3	STPD	4.41	40	SYN	Update	327	4.14	14.071247	157.87337
STPD	2019	May	34.62	3	STPD	5.42	54.8	SYN	Update	430	2.4	13.8	141.2
STPD	2019	September	16.08	3	STPD	2.01	33.6	SYN	Update	267	4.2	11.073753	122.9323
SWWL	2012	September	20.16	1	SWWL	644	1540	SYN	EVWQP	-	2.23	7.1	70.8
THPD	2012	September	16.79	1	THPD	145	743	SYN	EVWQP	-	3.11	17.3	170
UPBEC	2019	July	5.64	3	UPBEC	1.41	30.8	SYN	Update	302	1.9	11.36	96.8
UPBEC	2019	September	10.59	3	UPBEC	1.83	40.9	SYN	Update	313	0.74	9.76	92.7
UPGHC	2018	July	0.99	3	UPGHC	0.125	4.83	SYN	Update	333	14	7.2439216	69.498201
WPEF	2019	June	6.99	3	WPEF	0.8	16.9	SYN	Update	403	13	11.2	113.2
WWER	2019	May	4.98	3	WWER	0.728	25.3	SYN	Update	415	7.3	7.49	84.2
WWER	2019	June	11.77	3	WWER	1.18	21.9	SYN	Update	402	2.3	11.2	102
WWRBP	2013	July	33.00	1	WWRBP	1.31	20	SYN	Update	-	-	-	-

Table A-1

Compiled Lotic Dataset for Paired Invertebrate Tissue Selenium and Aqueous Selenium and Sulphate Concentrations

Invertebrate Monitoring Station	Flow Description	Flow Category	Substrate Description	Substrate Category	Sediment TOC (%)	Maximum Depth (cm)	Average Depth (cm)	Depth Category	Aquatic Vegetation Coverage	Aquatic Vegetation Category	Emergent Vegetation Category	Submergent Vegetation Category
ALE1	slow	1	silt/sand + organic	3	-	100	50	1	-	4	4	4
ALE1	slow	1	silt/sand + organic	3	-	100	50	1	-	4	4	4
ALE1	slow	1	silt/sand + organic	3	11.82	100	50	1	-	4	4	4
ALEI	slow	1	silt/sand + organic	3	-	100	50	1	-	4	4	4
AQU1	slow	1	silt/sand + organic	3	-	50	50	0	-	4	4	3
AQU1	slow	1	silt/sand + organic	3	-	50	50	0	-	4	4	3
AQU1	slow	1	silt/sand + organic	3	-	50	50	0	-	4	4	3
AQU1	slow	1	silt/sand + organic	3	21.35	50	50	0	-	4	4	3
BA6	trace	3	silt/sand + organic	3	8.90	100	0	1	51-75%	3	-	-
BOPDE	nil	4	silt/sand + organic	3	-	-	-	-	0	0	-	-
CUPO	slow	1	organic	4	-	>100	>100	2	-	3	3	0
DOMRS	slow	1	silt/sand + organic	3	-	>100	50 - 100	2	-	4	4	4
DOMRS	slow	1	silt/sand + organic	3	-	>100	50 - 100	2	-	4	4	4
EL14	slow	1	silt/sand + organic	3	4.90	-	-	-	0	0	-	-
EL14	slow	1	silt/sand + organic	3	-	-	-	-	0	0	-	-
EL14	slow	1	silt/sand + organic	3	4.76	-	-	-	0	0	-	-
EL14O	slow	1	fine to coarse	1	-	-	-	-	0	0	-	-
EL18	-	1	-	-	4.50	-	-	-	-	-	-	-
ELKO	-	1	-	-	-	-	-	-	-	-	-	-
ELKO	-	1	silt/sand + organic	3	3.23	-	-	-	1-25%	1	-	-
ELKOL	trace	1	organic	4	-	-	-	-	1-25%	1	-	-
ELKOM	trace	1	organic	4	-	-	-	-	1-25%	1	-	-
ELKOU	trace	1	silt/sand	2	-	-	-	-	1-25%	1	-	-
ELWDGC	slow	1	silt/sand + organic	3	-	-	-	-	76-100%	4	-	-
ELWDGC	slow	1	silt/sand + organic	3	4.12	-	-	-	76-100%	4	-	-
ELWDGC	slow	1	silt/sand + organic	3	-	200	150	2	-	3	3	3
ELWDGC	slow	1	silt/sand + organic	3	4.83	200	150	2	-	4	3	4
ELWDGC	slow	1	silt/sand + organic	3	-	200	150	2	-	4	3	4
ELWDGC	slow	1	silt/sand + organic	3	-	200	150	2	-	3	3	3
EREV	slow	1	coarse	0	-	>100	50 - 100	2	-	3	1	3
ERH	slow	1	silt/sand + organic	3	-	50-100	<50	1	-	4	4	1
ERIMF	easonal flushir	2	silt/sand + organic	3	5.16	150	50-100	2	-	4	4	4
ERIMF	easonal flushir	2	silt/sand + organic	3	-	150	50-100	2	-	4	4	0
ERIMNF	slow	1	silt/sand	2	-	150 - 200	50 - 100	2	-	4	4	3
ERMO	lotic	0	organic	4	-	-	Unknown	-	-	4	4	4
EROL	trace	3	organic	4	3.62	-	150	2	76-100%	4	-	-
EROL	slow	1	silt/sand + organic	3	5.57	>75	>75	1	-	4	4	4
EROL	slow	1	silt/sand + organic	3	5.57	>75	>75	1	-	4	4	4
EROL	slow	1	silt/sand + organic	3	-	>75	>75	1	-	4	4	3
EROL	slow	1	silt/sand + organic	3	-	>75	>75	1	-	4	4	3
EROL	slow	1	silt/sand + organic	3	-	>75	>75	1	-	4	4	4
EROLL	trace	3	organic	4	-	-	150	2	76-100%	4	-	-
EROU	trace	3	organic	4	6.18	-	-	-	51-75%	3	-	-
EROU	nil	4	silt/sand + organic	3	6.64	100 - 200	50 - 100	2	-	4	4	3
EROU	nil	4	silt/sand + organic	3	-	100 - 200	50 - 100	2	-	4	4	0
EROU	nil	4	silt/sand + organic	3	-	100 - 200	50 - 100	2	-	4	4	4
EROUL	trace	3	organic	4	-	200	<1	2	76-100%	4	-	-
ERSCIM	slow	1	silt/sand	2	-	unknown	Unknown	-	-	1	1	1
ERSCMC	slow	1	fine to coarse	1	-	200	50 - 100	2	-	3	3	0
ERSCMC	slow	1	fine to coarse	1	-	200	50 - 100	2	-	4	3	4
ERST	easonal flushir	2	silt/sand	2	7.75	100	50 - 100	1	-	4	4	3
ERST	easonal flushir	2	silt/sand	2	-	200	100-150	2	-	4	4	3
ERST	easonal flushir	2	silt/sand	2	-	200	100-150	2	-	4	4	3
ERUP	-	-	-	-	5.38	-	-	-	Unknown	-	-	-
ERUP	easonal flushir	2	silt/sand + organic	3	-	150 - 200	100 - 150	2	-	4	4	4
ERUP	easonal flushir	2	silt/sand + organic	3	-	150 - 200	100 - 150	2	-	4	4	4
ERUP	easonal flushir	2	silt/sand + organic	3	-	150 - 200	100 - 150	2	-	4	4	4
ERUP	easonal flushir	2	silt/sand + organic	3	-	150 - 200	100 - 150	2	-	4	4	4
ERW	slow	1	silt/sand + organic	3	4.63	>100	50 - 100	2	-	4	4	1
ERW	slow	1	silt/sand + organic	3	-	>100	50 - 100	2	-	4	4	0
ERWCO	slow	1	silt/sand + organic	3	6.93	200	50 - 100	2	-	3	3	3
ERWSF	nil	4	silt/sand + organic	3	-	-	-	-	76-100%	4	-	-
ERWSF	easonal flushir	2	silt/sand + organic	3	5.92	50 - 100	50	1	-	4	4	0
ERWSF	easonal flushir	2	silt/sand + organic	3	-	50 - 100	50	1	-	4	4	0
ERWSF	easonal flushir	2	silt/sand + organic	3	-	50 - 100	50	1	-	4	4	4
ERWSF	easonal flushir	2	silt/sand + organic	3	-	50 - 100	50	1	-	4	4	0
EV_AQW	-	-	-	-	-	-	-	-	-	-	-	-
EV_ERP2	-	-	-	-	-	-	-	-	-	-	-	-
EV_ERP3	-	-	-	-	-	-	-	-	-	-	-	-
EV_ERP4	-	-	-	-	-	-	-	-	-	-	-	-
GO13	-	-	-	-	-	-	-	-	-	-	-	-
GO13	-	-	-	-	-	-	-	-	-	-	-	-
EV_GAPD	-	-	-	-	-	-	-	-	-	-	-	-
HA7	-	-	-	-	-	-	-	-	-	-	-	-
HA7	-	-	-	-	-	-	-	-	-	-	-	-
HA7	-	-	-	-	-	-	-	-	-	-	-	-
EVPPS	slow	1	silt/sand + organic	3	-	>100	50 - 100	2	-	4	3	4
EVPPS	slow	1	silt/sand + organic	3	-	>100	50 - 100	2	-	3	3	1
EVPPS	slow	1	silt/sand + organic	3	8.18	>100	50 - 100	2	-	4	3	4
Fen	trace	3	organic	4	-	-	-	-	51-75%	3	-	-
FL17	nil	4	organic	4	6.70	400	0	4	26-50%	2	-	-
FL17	nil	4	organic	4	-	400	0	4	26-50%	2	-	-
FL17	nil	4	organic	4	-	400	0	4	1-25%	1	-	-

Table A-1

Compiled Lotic Dataset for Paired Invertebrate Tissue Selenium and Aqueous Selenium and Sulphate Concentrations

Invertebrate Monitoring Station	Flow Description	Flow Category	Substrate Description	Substrate Category	Sediment TOC (%)	Maximum Depth (cm)	Average Depth (cm)	Depth Category	Aquatic Vegetation Coverage	Aquatic Vegetation Category	Emergent Vegetation Category	Submergent Vegetation Category
FL17	slow	1	silt/sand + organic	3	-	>200	>200	3	-	3	3	0
FLA1	-	-	-	-	8.32	-	-	-	Unknown	-	-	-
FLA1	slow	1	silt/sand	2	-	150	50 - 100	2	-	4	1	4
FLA1	slow	1	silt/sand	2	-	150	50 - 100	2	-	4	1	4
FLOX	unknown	-	silt/sand	2	-	unknown	Unknown	-	-	4	4	4
FMUCK	-	-	-	-	5.60	-	-	-	Unknown	-	-	-
FO10	trace	3	organic	4	7.10	150	0	2	26-50%	2	-	-
FO10	easonal flushir	2	silt/sand	2	8.19	50 - 100	< 50	1	-	4	4	0
FO10L	trace	3	organic	4	-	150	0	2	26-50%	2	-	-
FO15	nil	4	silt/sand + organic	3	5.40	100	30	1	76-100%	4	-	-
FO15	nil	4	silt/sand + organic	3	-	100	30	1	76-100%	4	-	-
FO15	nil	4	silt/sand + organic	3	-	100	30	1	76-100%	4	2	2
FO15	Trace	3	organic	4	7.64	>100	50-100	2	-	4	4	0
FO15	Trace	3	organic	4	-	>100	50-100	2	-	4	4	0
FO15	Trace	3	organic	4	-	>100	50-100	2	-	4	4	0
FO15B	nil	4	silt/sand + organic	3	-	100	30	1	26-50%	2	-	-
FO15B	Trace	3	organic	4	-	>100	50-100	2	-	4	4	0
FOFR2	slow	1	silt/sand + organic	3	11.18	>100	50-100	2	-	4	4	4
FOFR2W	trace	3	silt/sand + organic	3	-	-	-	-	51-75%	3	-	-
FOFR2W	slow	1	silt/sand + organic	3	-	>100	50-100	2	-	4	4	4
FOFR2W	slow	1	silt/sand + organic	3	-	>100	50-100	2	-	4	4	4
FOXCF	nil	4	silt/sand	2	8.54	>100	50 - 100	2	-	3	3	1
FOXL	-	-	silt/sand + organic	3	11.78	-	-	-	51-75%	3	-	-
FOXLL	trace	3	organic	4	-	-	-	-	1-25%	1	-	-
CL11	-	-	-	-	-	-	-	-	-	-	-	-
HE27	-	-	-	-	-	-	-	-	-	-	-	-
FRSCW	easonal flushir	2	fine to coarse	1	-	100 - 200	50 - 100	2	-	0	0	0
FRSO	Trace	3	silt/sand + organic	3	-	50 - 100	<50	1	-	4	4	0
FRWUCH	nil	4	silt/sand	2	9.54	>50	50 - 100	2	-	3	3	0
FSTRC	nil	4	silt/sand + organic	3	-	>100	50 - 100	2	-	4	4	1
FWDEC	-	-	-	-	13.82	-	-	-	Unknown	-	-	-
FWDEC	slow	1	silt/sand + organic	3	12.63	>100	50 - 100	2	-	4	4	0
GAPDLg	trace	3	fine to coarse	1	-	-	-	-	1-25%	1	-	-
GAPD-SM	nil	4	silt/sand + organic	3	-	-	<50	0	51-75%	3	-	-
GARD	unknown	-	silt/sand + organic	3	-	unknown	unknown	-	-	4	4	0
GHPD	-	-	-	-	-	-	-	-	-	-	-	-
FO10	-	-	-	-	-	-	-	-	-	-	-	-
FO10	-	-	-	-	-	-	-	-	-	-	-	-
THPD	-	-	-	-	-	-	-	-	-	-	-	-
GHPD	trace	3	silt/sand + organic	3	-	-	-	-	51-75%	3	-	-
GHSCW	lotic	0	silt/sand	2	3.99	200	0.5	2	-	4	4	0
GHWTC	Trace	3	silt/sand + organic	3	-	50	<50	1	-	4	4	0
GLM	nil	4	organic	4	-	>100	50	2	76-100%	4	1	4
GLML	Trace	3	silt/sand + organic	3	-	>100	50 - 100	2	-	4	4	0
GLMLg	nil	4	organic	4	-	>100	50	2	76-100%	4	-	-
GLMS	nil	4	organic	4	27.19	>100	50 - 100	2	-	4	4	4
GLMS	nil	4	organic	4	27.19	>100	50 - 100	2	-	4	4	4
GLMS	nil	4	organic	4	-	>100	50 - 100	2	-	4	4	1
GLMS	nil	4	organic	4	-	>100	50 - 100	2	-	4	4	1
GLMS	nil	4	organic	4	-	>100	50 - 100	2	-	4	4	1
GO13	trace	3	organic	4	14.00	75	0	1	51-75%	3	-	-
GO13	trace	3	organic	4	13.31	75	0	1	51-75%	3	-	-
GO13	slow	1	silt/sand + organic	3	19.02	>100	50 - 100	2	-	4	4	1
GO13	slow	1	silt/sand + organic	3	-	>100	50 - 100	2	-	4	4	1
GO13	slow	1	silt/sand + organic	3	-	>100	50 - 100	2	-	4	4	1
GO13	slow	1	silt/sand + organic	3	-	>100	50 - 100	2	-	4	4	1
GO13	slow	1	silt/sand + organic	3	10.95	>100	50 - 100	2	-	4	4	1
GO13L	trace	3	organic	4	-	75	0	1	26-50%	2	-	-
GO13	-	-	-	-	-	-	-	-	-	-	-	-
GRLK	slow	1	silt/sand	2	-	>200	100 - 200	3	-	1	1	0
GRLK	slow	1	silt/sand	2	-	>200	100 - 200	3	-	1	1	0
GRLK	slow	1	silt/sand	2	-	>200	100 - 200	3	-	1	1	0
HA7	trace	3	silt/sand + organic	3	15.00	500	0	4	1-25%	1	-	-
HA7I	trace	3	silt/sand + organic	3	-	500	0	4	0	0	-	-
HAPD	-	-	-	-	-	-	-	-	-	-	-	-
HART	slow	1	silt/sand + organic	3	-	>200	100 - 200	3	-	4	4	1
HART	slow	1	silt/sand + organic	3	-	>200	100 - 200	3	-	4	4	1
HART	slow	1	silt/sand + organic	3	-	>200	100 - 200	3	-	4	4	1
HE27	trace	3	silt/sand + organic	3	-	-	-	-	0	0	-	-
HE27	trace	3	silt/sand + organic	3	6.09	-	-	-	0	0	-	-
HE27	-	-	-	-	-	-	-	-	-	-	-	-
HE27	slow	1	silt/sand	2	7.63	>200	100 - 200	3	-	3	3	0
HE27	slow	1	silt/sand	2	-	>200	100 - 200	3	-	3	3	0
KSPS	trace	3	fine to coarse	1	-	-	-	-	0	0	-	-
ELKO U/S	-	-	-	-	-	-	-	-	-	-	-	-
FORP	-	-	-	-	-	-	-	-	-	-	-	-
MSAN	-	-	-	-	-	-	-	-	-	-	-	-
LCCPL	-	-	-	-	-	-	-	-	-	-	-	-
LCCPL	-	-	-	-	-	-	-	-	-	-	-	-
NNP	-	-	-	-	-	-	-	-	-	-	-	-
LCCPU/L	-	-	-	-	-	-	-	-	-	-	-	-
LCHO	-	-	-	-	7.70	-	-	-	Unknown	-	-	-
LCHOB	unknown	-	silt/sand + organic	3	-	unknown	unknown	-	-	4	4	0

Table A-1
Compiled Lotic Dataset for Paired Invertebrate Tissue Selenium and Aqueous Selenium and Sulphate Concentrations

Invertebrate Monitoring Station	Flow Description	Flow Category	Substrate Description	Substrate Category	Sediment TOC (%)	Maximum Depth (cm)	Average Depth (cm)	Depth Category	Aquatic Vegetation Coverage	Aquatic Vegetation Category	Emergent Vegetation Category	Submergent Vegetation Category
LFSRW	slow	1	silt/sand + organic	3	-	<100	50 - 100	1	-	4	4	0
LFSRW	slow	1	silt/sand + organic	3	-	<100	50 - 100	1	-	4	4	0
LFSRW	slow	1	silt/sand + organic	3	-	<100	50 - 100	1	-	4	4	0
LFSRW	slow	1	silt/sand + organic	3	9.70	<100	50 - 100	1	-	4	4	0
LK01	slow	1	silt/sand	2	-	-	20	0	0	0	-	-
LK02	slow	1	silt/sand + organic	3	-	-	20	0	0	0	-	-
LK02	slow	1	silt/sand + organic	3	-	-	-	-	0	0	-	-
LK02	-	-	-	-	-	-	-	-	-	-	-	-
LkMtn2	nil	4	silt/sand + organic	3	-	-	-	-	51-75%	3	-	-
LML	nil	4	silt/sand + organic	3	23.38	-	-	-	51-75%	3	-	-
LML	slow	1	silt/sand + organic	3	-	-	unknown	-	-	4	4	0
LPLML	easonal flushir	2	silt/sand	2	11.14	>100	50 - 100	2	-	4	4	0
LPLML	easonal flushir	2	silt/sand	2	-	>100	50 - 100	2	-	3	3	0
MCIMCC	slow	1	silt/sand	2	-	>100	50 - 100	2	-	3	3	0
MCIMCC	slow	1	silt/sand	2	-	>100	50 - 100	2	-	4	4	0
MCUP	easonal flushir	2	silt/sand	2	-	>100	50 - 100	2	-	4	4	4
MCWA	slow	1	silt/sand	2	-	<100	50 - 100	1	-	4	3	4
MCWA	slow	1	silt/sand	2	14.66	<100	50 - 100	1	-	4	3	4
MI16	trace	3	silt/sand + organic	3	3.90	-	-	-	1-25%	1	-	-
MI16	trace	3	silt/sand + organic	3	-	-	-	-	1-25%	1	-	-
MI16	trace	3	silt/sand + organic	3	7.21	-	-	-	1-25%	1	-	-
MI16	easonal flushir	2	silt/sand	2	7.73	>100	50 - 100	2	-	4	4	4
MI16	easonal flushir	2	silt/sand	2	-	>100	50 - 100	2	-	4	4	4
MI16L	trace	3	silt/sand + organic	3	-	-	-	-	0	0	-	-
MIC2	-	-	-	-	4.82	-	-	-	Unknown	-	-	-
MIC2	slow	1	silt/sand + organic	3	-	>100	50 - 100	2	-	4	4	4
MIWW	trace	3	organic	4	-	-	-	-	76-100%	4	-	-
MIWW	trace	3	organic	4	5.69	-	-	-	76-100%	4	-	-
MIWW	slow	1	silt/sand	2	6.05	>100	50 - 100	2	-	4	4	4
MIWW	slow	1	silt/sand	2	-	>100	50 - 100	2	-	4	4	4
MIWW	slow	1	silt/sand	2	-	>100	50 - 100	2	-	4	4	4
MIWW	slow	1	silt/sand	2	-	>100	50 - 100	2	-	4	4	4
MCW	-	-	-	-	-	-	-	-	-	-	-	-
MIW1	-	-	-	-	-	-	-	-	-	-	-	-
MIW2	-	-	-	-	-	-	-	-	-	-	-	-
MIW3	-	-	-	-	-	-	-	-	-	-	-	-
MIW4	-	-	-	-	-	-	-	-	-	-	-	-
NAYDAY	nil	4	silt/sand + organic	3	-	50 - 100	50 - 100	1	-	4	4	0
EV_OCW	-	-	-	-	-	-	-	-	-	-	-	-
OTTO	trace	3	silt/sand + organic	3	23.65	-	-	-	1-25%	1	-	-
OTTO	slow	1	silt/sand	2	23.78	>100	>100	2	-	4	4	3
OTTO	slow	1	silt/sand	2	-	>100	>100	2	-	4	4	3
OTTO	slow	1	silt/sand	2	-	>100	>100	2	-	4	4	3
OTTO	slow	1	silt/sand	2	-	>100	>100	2	-	4	4	3
OTTO	slow	1	silt/sand	2	-	>100	>100	2	-	4	4	3
OTTOL	trace	3	silt/sand + organic	3	-	-	-	-	1-25%	1	-	-
PAIR	slow	1	coarse	0	-	>100	50 - 100	2	-	4	4	3
PAIR	slow	1	coarse	0	6.93	>100	50 - 100	2	-	4	4	3
PWP	nil	4	silt/sand + organic	3	-	50 - 100	<50	1	-	4	4	0
R115	slow	1	silt/sand	2	-	25	10	0	1-25%	1	0	1
R118	slow	1	fine to coarse	1	-	60	20	1	0	0	0	0
R12	slow	1	silt/sand + organic	3	-	130	50	2	1-25%	1	0	0
R120	nil	1	silt/sand + organic	3	-	120	50	2	1-25%	1	0	1
R129	slow	1	silt/sand	2	-	400	150	4	1-25%	1	0	1
R144	trace	3	organic	4	-	100	40	1	51-75%	3	1	3
R144	slow	1	silt/sand + organic	3	12.43	>100	50 - 100	2	-	4	4	4
R161	trace	3	silt/sand	2	-	60	30	1	1-25%	1	1	0
R176	slow - seasona	2	silt/sand	2	-	>100	100	2	51-75%	3	2	3
R2101	slow - seasona	2	fine to coarse	1	-	40	25	0	0	0	0	0
R2108	nil	4	organic	4	-	100	100	1	51-75%	3	1	2
R2110	slow - seasona	2	silt/sand	2	-	70	60	1	0	0	0	0
R2113	slow	1	coarse	0	-	70	60	1	0	0	0	0
R2122A	slow - seasona	1	coarse	0	-	60	60	1	0	0	0	0
R2122B	slow - seasona	1	coarse	0	-	60	60	1	0	0	0	0
R2124	slow	1	coarse	0	-	40	35	0	1-25%	1	0	0
R280A	slow	1	coarse	0	-	30	10	0	26-50%	2	0	0
R292	slow	1	silt/sand + organic	3	-	15	10	0	51-75%	3	2	1
R3127	slow	1	fine to coarse	1	-	50	25	0	26-50%	2	0	2
R3129	slow	1	silt/sand	2	-	<100	<100	1	0	0	0	0
R3137	slow - seasona	2	silt/sand	2	-	10	10	0	1-25%	1	0	1
R3138	race - seasona	3	silt/sand + organic	3	-	70	20	1	76-100%	4	2	3
R3138	slow	1	silt/sand + organic	3	-	>100	50 - 100	2	-	4	4	0
R3139	trace	3	silt/sand	2	-	30	15	0	76-100%	4	2	2
R3145	slow	1	silt/sand + organic	3	-	>300	>300	4	76-100%	4	1	4
R3153	slow	1	silt/sand	2	-	100	60	1	0	0	0	0
R3157	slow	1	silt/sand	2	-	>50	30	1	26-50%	2	0	0
R4159	nil	1	organic	4	-	100	50	1	76-100%	4	2	3
R4160	slow	1	silt/sand	2	-	>400	>200	4	0	0	0	0
R4161	nil	1	silt/sand + organic	3	-	100	50	1	51-75%	3	3	0
R4162	slow	1	silt/sand + organic	3	-	60	50	1	1-25%	1	0	0
R4163	trace	1	silt/sand + organic	3	-	100	50	1	26-50%	2	2	2
R4164	nil	1	silt/sand + organic	3	-	100	70	1	51-75%	3	1	3
R4165	slow	1	silt/sand	2	-	100	50	1	51-75%	3	2	3

Table A-1

Compiled Lotic Dataset for Paired Invertebrate Tissue Selenium and Aqueous Selenium and Sulphate Concentrations

Invertebrate Monitoring Station	Flow Description	Flow Category	Substrate Description	Substrate Category	Sediment TOC (%)	Maximum Depth (cm)	Average Depth (cm)	Depth Category	Aquatic Vegetation Coverage	Aquatic Vegetation Category	Emergent Vegetation Category	Submergent Vegetation Category
R51	nil	1	silt/sand	2	-	30	20	0	1-25%	1	0	1
R5-1	nil	1	silt/sand	2	8.69	30	20	0	1-25%	1	-	-
R510	trace	1	silt/sand + organic	3	-	100	25	1	1-25%	1	1	0
R517	slow	1	silt/sand	2	-	>200	70	3	26-50%	2	2	0
R52	nil	1	organic	4	-	Unknown	30	0	76-100%	4	3	1
R53	slow	1	fine to coarse	1	-	>150	30	2	26-50%	2	2	1
R53	-	1	-	-	5.11	-	-	-	-	-	-	-
R54	slow - seasona	1	silt/sand	2	-	40	20	0	0	0	0	0
R55	trace	1	silt/sand	2	-	200	100	2	1-25%	1	1	0
R59	slow	1	silt/sand	2	-	60	20	1	1-25%	1	0	0
R612	slow - seasona	1	coarse	0	-	30	30	0	1-25%	1	0	0
R614	slow - seasona	1	coarse	0	-	40	30	0	1-25%	1	0	1
R615A	race - seasona	1	silt/sand + organic	3	-	100	40	1	1-25%	1	1	0
R615B	slow	1	silt/sand	2	-	20	10	0	1-25%	1	1	0
R62	nil	1	silt/sand + organic	3	-	100	>100	1	1-25%	1	0	1
R635	slow	1	silt/sand	2	-	20	10	0	26-50%	2	2	0
R636	slow - seasona	1	silt/sand	2	-	60	30	1	26-50%	2	0	0
R636	slow - seasona	1	silt/sand	2	-	60	30	1	26-50%	2	0	0
R644	slow	1	coarse	0	-	100	60	1	0	0	0	0
R651	nil	1	silt/sand	2	-	>100	>100	2	-	4	4	0
R7109	slow - seasona	1	silt/sand	2	-	>200	100	3	51-75%	3	0	3
R7114A	slow	1	coarse	0	-	100	70	1	1-25%	1	1	0
R7114B	slow	1	coarse	0	-	100	70	1	1-25%	1	1	0
R747	nil	1	silt/sand	2	-	80	60	1	26-50%	2	2	0
R748	nil	1	silt/sand + organic	3	-	70	50	1	1-25%	3	1	1
R749	nil	1	silt/sand + organic	3	-	60	50	1	1-25%	1	0	1
R751	nil	1	silt/sand + organic	3	-	50	30	0	1-25%	1	1	0
R764	slow	1	silt/sand	2	-	70	35	1	1-25%	1	0	0
REFF	nil	4	organic	4	-	>500	30	4	0	0	-	-
REFF	nil	4	organic	4	-	>500	30	4	51-75%	3	3	0
REFF	nil	4	organic	4	9.47	>500	30	4	51-75%	3	-	-
REFF	nil	4	silt/sand + organic	3	7.55	>200	50 - 150	3	-	3	0	0
ELKO	-	-	-	-	-	-	-	-	-	-	-	-
T4	-	-	-	-	-	-	-	-	-	-	-	-
T4	-	-	-	-	1.33	-	-	-	-	-	-	-
T4	-	-	-	-	1.33	-	-	-	-	-	-	-
T4	-	-	-	-	-	-	-	-	-	-	-	-
T4	-	-	-	-	1.57	-	-	-	-	-	-	-
T4	-	-	-	-	1.57	-	-	-	-	-	-	-
T4	-	-	-	-	-	-	-	-	-	-	-	-
T4	-	-	-	-	1.20	-	-	-	-	-	-	-
T4	-	-	-	-	1.20	-	-	-	-	-	-	-
TN	-	-	-	-	1.17	-	-	-	-	-	-	-
TN	-	-	-	-	1.17	-	-	-	-	-	-	-
TN	-	-	-	-	-	-	-	-	-	-	-	-
TN	-	-	-	-	1.19	-	-	-	-	-	-	-
TN	-	-	-	-	1.19	-	-	-	-	-	-	-
T2	-	-	-	-	-	-	-	-	-	-	-	-
T2	-	-	-	-	1.30	-	-	-	-	-	-	-
T2	-	-	-	-	1.30	-	-	-	-	-	-	-
T2	-	-	-	-	-	-	-	-	-	-	-	-
RL1	nil	4	silt/sand + organic	3	-	-	-	-	0	0	-	-
SEROX	nil	4	silt/sand	2	-	<50	<50	0	-	4	4	3
SEROX	nil	4	silt/sand	2	-	<50	<50	0	-	4	4	3
SEROX	nil	4	silt/sand	2	-	<50	<50	0	-	4	4	3
SEROX	nil	4	silt/sand	2	4.27	<50	<50	0	-	4	4	3
EV_SMCW	-	-	-	-	-	-	-	-	-	-	-	-
SMCIM	slow	1	silt/sand + organic	3	-	100 - 200	100 - 200	2	-	4	4	4
SMCIM	slow	1	silt/sand + organic	3	-	>200	100 - 200	3	-	4	4	4
SMCIM	slow	1	silt/sand + organic	3	-	>200	100 - 200	3	-	4	4	4
SMCIM	slow	1	silt/sand + organic	3	5.48	>200	100 - 200	3	-	4	4	4
STPD	-	-	-	-	6.04	-	-	-	Unknown	-	-	-
STPD	easonal flushin	2	coarse	0	4.20	>100	50 - 100	2	-	4	1	4
STPD	easonal flushin	2	coarse	0	-	>100	50 - 100	2	-	4	1	4
STPD	easonal flushin	2	coarse	0	-	>100	50 - 100	2	-	4	1	4
SWWL	trace	3	silt/sand + organic	3	-	-	-	-	0	0	-	-
THPD	trace	3	silt/sand + organic	3	-	-	-	-	76-100%	4	-	-
UPBEC	slow	1	silt/sand	2	-	<100	50 - 100	1	-	3	3	0
UPBEC	slow	1	silt/sand	2	9.36	<100	50 - 100	1	-	3	3	0
UPGHC	nil	4	organic	4	27.70	>0.5	50 - 100	1	-	3	3	3
WPEF	nil	4	silt/sand + organic	3	-	>100	50 - 100	2	-	4	4	1
WWER	nil	4	silt/sand	2	-	<100	50 - 100	1	-	3	3	0
WWER	nil	4	silt/sand	2	-	<100	50 - 100	1	-	3	3	0
WWRBP	-	-	-	-	-	-	-	-	-	-	-	-

Table A-1

Compiled Lotic Dataset for Paired Invertebrate Tissue Selenium and Aqueous Selenium and Sulphate Concentrations

Invertebrate Monitoring Station	Algae Coverage Category	Cattail Coverage Category	Chara Coverage Category	Burr Reed Coverage Category	Duckweed Coverage Category	Filamentous Algae Coverage Category	Grasses Coverage Category	Mares Tail Coverage Category	Pond Lily Coverage Category	Pondweed Coverage Category	Rushes Coverage Category	Sedges Coverage Category	Water Milfoil Coverage Category
ALE1	3	0	4	4	0	3	4	0	0	0	0	4	3
ALE1	3	0	4	4	0	3	4	0	0	0	0	4	3
ALE1	3	0	4	4	0	3	4	0	0	0	0	4	3
ALEI	3	0	4	4	0	3	4	0	0	0	0	4	3
AQU1	3	0	3	3	0	3	4	0	0	0	3	4	1
AQU1	3	0	3	3	0	3	4	0	0	0	3	4	1
AQU1	3	0	3	3	0	3	4	0	0	0	3	4	1
AQU1	3	0	3	3	0	3	4	0	0	0	3	4	1
BA6	-	-	-	-	-	-	-	-	-	-	-	-	-
BOPDE	-	-	-	-	-	-	-	-	-	-	-	-	-
CUPO	3	1	0	0	0	3	3	0	0	0	0	0	0
DOMRS	0	1	4	0	0	0	4	0	0	0	0	0	0
DOMRS	4	1	4	0	0	4	4	4	0	0	0	0	0
EL14	-	-	-	-	-	-	-	-	-	-	-	-	-
EL14	-	-	-	-	-	-	-	-	-	-	-	-	-
EL14	-	-	-	-	-	-	-	-	-	-	-	-	-
EL14O	-	-	-	-	-	-	-	-	-	-	-	-	-
EL18	-	-	-	-	-	-	-	-	-	-	-	-	-
ELKO	-	-	-	-	-	-	-	-	-	-	-	-	-
ELKO	-	-	-	-	-	-	-	-	-	-	-	-	-
ELKOL	-	-	-	-	-	-	-	-	-	-	-	-	-
ELKOM	-	-	-	-	-	-	-	-	-	-	-	-	-
ELKOU	-	-	-	-	-	-	-	-	-	-	-	-	-
ELWDGC	-	-	-	-	-	-	-	-	-	-	-	-	-
ELWDGC	-	-	-	-	-	-	-	-	-	-	-	-	-
ELWDGC	1	0	0	0	0	1	3	0	0	3	0	0	0
ELWDGC	1	0	4	0	0	1	3	0	0	3	0	0	0
ELWDGC	1	0	4	0	0	1	3	0	0	3	0	0	0
ELWDGC	1	0	0	0	0	1	3	0	0	3	0	0	0
EREV	1	0	0	1	0	1	1	0	0	3	0	0	0
ERH	3	0	0	0	0	3	4	0	0	1	3	4	0
ERIMF	1	4	0	0	0	1	4	3	0	0	1	0	4
ERIMF	1	4	0	1	0	1	4	0	0	0	1	0	0
ERIMNF	3	0	3	1	0	3	4	0	0	0	0	0	0
ERMO	0	0	4	0	0	0	4	3	0	0	0	0	0
EROL	-	-	-	-	-	-	-	-	-	-	-	-	-
EROL	3	4	4	0	0	3	3	1	0	0	3	3	0
EROL	3	4	4	0	0	3	3	1	0	0	3	3	0
EROL	3	4	3	0	0	3	3	0	0	0	3	3	0
EROL	3	4	3	0	0	3	3	0	0	0	3	3	0
EROL	3	4	4	0	0	3	3	1	0	0	3	3	0
EROLL	-	-	-	-	-	-	-	-	-	-	-	-	-
EROU	-	-	-	-	-	-	-	-	-	-	-	-	-
EROU	3	1	3	0	0	3	4	3	0	3	0	0	3
EROU	3	1	0	0	0	3	4	3	0	0	0	0	0
EROU	3	1	0	0	0	3	4	3	0	0	0	0	4
EROUL	-	-	-	-	-	-	-	-	-	-	-	-	-
ERSCIM	0	0	1	0	0	0	1	0	0	0	0	0	0
ERSCMC	1	3	0	0	0	1	3	0	0	0	0	0	0
ERSCMC	1	3	4	0	0	1	3	0	0	0	0	0	0
ERST	1	0	3	0	0	1	4	0	0	0	0	0	0
ERST	1	0	3	0	0	1	4	0	0	0	0	0	0
ERST	1	0	3	0	0	1	4	0	0	0	0	0	0
ERUP	-	-	-	-	-	-	-	-	-	-	-	-	-
ERUP	4	0	4	4	0	4	4	4	0	0	4	4	0
ERUP	4	0	4	0	0	4	4	4	0	0	4	4	0
ERUP	4	0	4	0	0	4	4	4	0	0	4	4	0
ERUP	4	0	4	4	0	4	4	4	0	0	4	4	0
ERW	1	4	1	0	0	1	3	4	0	0	3	4	0
ERW	1	4	0	0	0	1	3	4	0	0	3	4	0
ERWCO	1	1	3	0	0	1	3	0	0	1	0	0	0
ERWSF	-	-	-	-	-	-	-	-	-	-	-	-	-
ERWSF	4	4	0	3	4	4	3	3	0	0	1	0	0
ERWSF	4	4	0	0	4	4	3	3	0	0	0	0	0
ERWSF	4	4	4	0	4	4	3	3	3	0	0	0	0
ERWSF	4	4	0	3	4	4	3	3	0	0	1	0	0
EV_AQW	-	-	-	-	-	-	-	-	-	-	-	-	-
EV_ERP2	-	-	-	-	-	-	-	-	-	-	-	-	-
EV_ERP3	-	-	-	-	-	-	-	-	-	-	-	-	-
EV_ERP4	-	-	-	-	-	-	-	-	-	-	-	-	-
GO13	-	-	-	-	-	-	-	-	-	-	-	-	-
GO13	-	-	-	-	-	-	-	-	-	-	-	-	-
EV_GAPD	-	-	-	-	-	-	-	-	-	-	-	-	-
HA7	-	-	-	-	-	-	-	-	-	-	-	-	-
HA7	-	-	-	-	-	-	-	-	-	-	-	-	-
HA7	-	-	-	-	-	-	-	-	-	-	-	-	-
EVPPS	0	0	4	0	0	0	3	0	0	0	1	0	0
EVPPS	0	0	1	1	0	0	3	0	0	0	1	0	0
EVPPS	0	0	4	0	0	0	3	0	0	0	1	0	0
Fen	-	-	-	-	-	-	-	-	-	-	-	-	-
FL17	-	-	-	-	-	-	-	-	-	-	-	-	-
FL17	-	-	-	-	-	-	-	-	-	-	-	-	-
FL17	-	-	-	-	-	-	-	-	-	-	-	-	-

Table A-1

Compiled Lotic Dataset for Paired Invertebrate Tissue Selenium and Aqueous Selenium and Sulphate Concentrations

Invertebrate Monitoring Station	Algae Coverage Category	Cattail Coverage Category	Chara Coverage Category	Burr Reed Coverage Category	Duckweed Coverage Category	Filamentous Algae Coverage Category	Grasses Coverage Category	Mares Tail Coverage Category	Pond Lily Coverage Category	Pondweed Coverage Category	Rushes Coverage Category	Sedges Coverage Category	Water Milfoil Coverage Category
FL17	3	0	0	0	0	3	3	0	0	0	0	0	0
FLA1	-	-	-	-	-	-	-	-	-	-	-	-	-
FLA1	4	0	4	0	0	4	1	0	0	0	0	0	0
FLA1	4	0	4	0	0	4	1	0	0	0	0	0	0
FLOX	1	0	3	3	0	1	4	3	0	0	3	3	4
FMUCK	-	-	-	-	-	-	-	-	-	-	-	-	-
FO10	-	-	-	-	-	-	-	-	-	-	-	-	-
FO10	1	0	0	0	0	1	4	0	0	0	0	0	0
FO10L	-	-	-	-	-	-	-	-	-	-	-	-	-
FO15	-	-	-	-	-	-	-	-	-	-	-	-	-
FO15	-	-	-	-	-	-	-	-	-	-	-	-	-
FO15	1	-	-	-	-	-	-	-	-	-	-	-	-
FO15	3	4	0	4	1	3	4	1	0	0	0	0	0
FO15	1	4	0	1	1	1	4	0	0	0	0	0	0
FO15	1	4	0	1	1	1	4	0	0	0	0	0	0
FO15B	-	-	-	-	-	-	-	-	-	-	-	-	-
FO15B	3	4	0	1	0	3	4	0	0	0	0	0	0
FOFR2	3	0	4	0	0	3	4	3	0	0	4	3	0
FOFR2W	-	-	-	-	-	-	-	-	-	-	-	-	-
FOFR2W	3	0	4	0	0	3	4	3	0	0	4	0	0
FOFR2W	3	0	4	0	0	3	4	3	0	0	4	0	0
FOXCF	1	0	1	0	1	1	3	1	0	0	0	0	0
FOXL	-	-	-	-	-	-	-	-	-	-	-	-	-
FOXLL	-	-	-	-	-	-	-	-	-	-	-	-	-
CL11	-	-	-	-	-	-	-	-	-	-	-	-	-
HE27	-	-	-	-	-	-	-	-	-	-	-	-	-
FRSCW	0	0	0	0	0	0	0	0	0	0	0	0	0
FRSO	0	0	0	0	0	0	3	0	0	0	4	0	0
FRWUCH	1	0	0	0	0	1	3	0	0	0	0	0	0
FSTRC	3	1	1	0	0	3	4	0	0	0	0	0	0
FWDEC	-	-	-	-	-	-	-	-	-	-	-	-	-
FWDEC	3	0	0	1	0	3	4	3	0	0	0	0	0
GAPDLg	-	-	-	-	-	-	-	-	-	-	-	-	-
GAPD-SM	-	-	-	-	-	-	-	-	-	-	-	-	-
GARD	0	0	0	0	0	0	4	0	0	0	0	0	0
GHPD	-	-	-	-	-	-	-	-	-	-	-	-	-
FO10	-	-	-	-	-	-	-	-	-	-	-	-	-
FO10	-	-	-	-	-	-	-	-	-	-	-	-	-
THPD	-	-	-	-	-	-	-	-	-	-	-	-	-
GHPD	-	-	-	-	-	-	-	-	-	-	-	-	-
GHSCW	0	0	0	0	0	0	3	0	0	0	0	4	0
GHWTC	0	0	0	0	0	0	3	0	0	0	4	0	0
GLM	1	-	-	-	-	-	-	-	-	-	-	-	-
GLML	3	0	0	0	0	3	4	0	0	0	0	0	0
GLMLg	-	-	-	-	-	-	-	-	-	-	-	-	-
GLMS	1	3	1	0	3	1	4	4	0	4	0	0	0
GLMS	1	3	1	0	3	1	4	4	0	4	0	0	0
GLMS	1	3	1	0	0	1	4	0	0	0	0	0	0
GLMS	1	3	1	0	0	1	4	0	0	0	0	0	0
GLMS	1	3	1	0	3	1	4	0	0	0	0	0	0
GO13	-	-	-	-	-	-	-	-	-	-	-	-	-
GO13	-	-	-	-	-	-	-	-	-	-	-	-	-
GO13	3	4	0	1	0	3	4	3	0	0	3	3	1
GO13	3	4	0	0	0	3	4	3	0	0	3	3	1
GO13	3	4	0	0	0	3	4	3	0	0	3	3	1
GO13	3	4	0	1	0	3	4	3	0	0	3	3	1
GO13	3	4	0	1	0	3	4	3	0	0	3	3	1
GO13L	-	-	-	-	-	-	-	-	-	-	-	-	-
GO13	-	-	-	-	-	-	-	-	-	-	-	-	-
GRLK	1	1	0	0	0	1	0	1	0	0	1	0	0
GRLK	1	1	0	0	0	1	0	1	0	0	1	0	0
GRLK	1	1	0	0	0	1	0	1	0	0	1	0	0
HA7	-	-	-	-	-	-	-	-	-	-	-	-	-
HA7I	-	-	-	-	-	-	-	-	-	-	-	-	-
HAPD	-	-	-	-	-	-	-	-	-	-	-	-	-
HART	0	0	1	0	0	Unknown	4	0	0	0	0	0	0
HART	0	0	1	0	0	Unknown	4	0	0	0	0	0	0
HART	0	0	1	0	0	Unknown	4	0	0	0	0	0	0
HE27	-	-	-	-	-	-	-	-	-	-	-	-	-
HE27	-	-	-	-	-	-	-	-	-	-	-	-	-
HE27	-	-	-	-	-	-	-	-	-	-	-	-	-
HE27	0	0	0	1	0	0	3	0	0	0	0	1	0
HE27	0	0	0	1	0	0	3	0	0	0	0	0	0
KSPS	-	-	-	-	-	-	-	-	-	-	-	-	-
ELKO U/S	-	-	-	-	-	-	-	-	-	-	-	-	-
FORP	-	-	-	-	-	-	-	-	-	-	-	-	-
MSAN	-	-	-	-	-	-	-	-	-	-	-	-	-
LCCPL	-	-	-	-	-	-	-	-	-	-	-	-	-
LCCPL	-	-	-	-	-	-	-	-	-	-	-	-	-
NNP	-	-	-	-	-	-	-	-	-	-	-	-	-
LCCPU/L	-	-	-	-	-	-	-	-	-	-	-	-	-
LCHO	-	-	-	-	-	-	-	-	-	-	-	-	-
LCHOB	4	0	0	0	0	4	4	0	0	0	0	0	0

Table A-1

Compiled Lotic Dataset for Paired Invertebrate Tissue Selenium and Aqueous Selenium and Sulphate Concentrations

Invertebrate Monitoring Station	Algae Coverage Category	Cattail Coverage Category	Chara Coverage Category	Burr Reed Coverage Category	Duckweed Coverage Category	Filamentous Algae Coverage Category	Grasses Coverage Category	Mares Tail Coverage Category	Pond Lily Coverage Category	Pondweed Coverage Category	Rushes Coverage Category	Sedges Coverage Category	Water Milfoil Coverage Category
LFSRW	0	3	0	0	0	0	4	1	0	0	0	0	0
LFSRW	4	3	0	0	4	4	4	1	0	0	0	0	0
LFSRW	4	3	0	0	4	4	4	1	0	0	0	0	0
LFSRW	4	3	0	0	4	4	4	1	0	0	0	0	0
LK01	-	-	-	-	-	-	-	-	-	-	-	-	-
LK02	-	-	-	-	-	-	-	-	-	-	-	-	-
LK02	-	-	-	-	-	-	-	-	-	-	-	-	-
LK02	-	-	-	-	-	-	-	-	-	-	-	-	-
LkMtn2	-	-	-	-	-	-	-	-	-	-	-	-	-
LML	-	-	-	-	-	-	-	-	-	-	-	-	-
LML	0	0	0	3	0	0	4	0	0	0	0	0	0
LPLML	3	0	0	0	0	3	3	0	0	0	0	4	0
LPLML	3	0	0	0	0	3	3	0	0	0	0	0	0
MCIMCC	0	0	0	0	0	0	3	0	0	0	0	0	0
MCIMCC	0	0	0	0	0	0	3	4	0	0	0	0	0
MCUP	4	0	4	0	0	4	4	0	0	0	0	3	0
MCWA	0	0	4	0	0	0	3	0	0	0	0	0	0
MCWA	0	0	4	0	0	0	3	0	0	0	0	0	0
MI16	-	-	-	-	-	-	-	-	-	-	-	-	-
MI16	-	-	-	-	-	-	-	-	-	-	-	-	-
MI16	-	-	-	-	-	-	-	-	-	-	-	-	-
MI16	4	0	4	0	0	4	4	0	0	0	0	3	3
MI16	4	0	4	0	0	4	4	0	0	0	0	3	0
MI16L	-	-	-	-	-	-	-	-	-	-	-	-	-
MIC2	-	-	-	-	-	-	-	-	-	-	-	-	-
MIC2	1	0	4	0	0	1	4	0	0	0	0	3	0
MIWW	-	-	-	-	-	-	-	-	-	-	-	-	-
MIWW	-	-	-	-	-	-	-	-	-	-	-	-	-
MIWW	3	0	4	1	0	3	4	0	0	0	4	4	3
MIWW	3	0	4	3	0	3	4	0	0	0	0	3	3
MIWW	3	0	4	3	0	3	4	0	0	0	0	3	3
MIWW	3	0	4	1	0	3	4	0	0	0	4	4	3
MCW	-	-	-	-	-	-	-	-	-	-	-	-	-
MIW1	-	-	-	-	-	-	-	-	-	-	-	-	-
MIW2	-	-	-	-	-	-	-	-	-	-	-	-	-
MIW3	-	-	-	-	-	-	-	-	-	-	-	-	-
MIW4	-	-	-	-	-	-	-	-	-	-	-	-	-
NAYDAY	0	0	0	0	0	0	4	0	0	0	0	0	0
EV_OCW	-	-	-	-	-	-	-	-	-	-	-	-	-
OTTO	-	-	-	-	-	-	-	-	-	-	-	-	-
OTTO	3	4	3	1	0	3	4	1	0	0	1	3	3
OTTO	3	4	3	1	0	3	4	1	0	0	1	3	3
OTTO	3	4	3	1	0	3	4	1	0	0	1	3	3
OTTO	3	4	3	1	0	3	4	1	0	0	1	3	3
OTTO	3	4	3	1	0	3	4	1	0	0	1	3	3
OTTOL	-	-	-	-	-	-	-	-	-	-	-	-	-
PAIR	3	0	0	0	0	3	1	0	0	3	4	4	0
PAIR	3	0	0	0	0	3	1	0	0	3	4	4	0
PWP	1	0	0	0	0	1	4	0	0	0	0	0	0
R115	0	-	-	-	-	-	-	-	-	-	-	-	-
R118	0	-	-	-	-	-	-	-	-	-	-	-	-
R12	1	-	-	-	-	-	-	-	-	-	-	-	-
R120	0	-	-	-	-	-	-	-	-	-	-	-	-
R129	1	-	-	-	-	-	-	-	-	-	-	-	-
R144	0	-	-	-	-	-	-	-	-	-	-	-	-
R144	0	1	4	0	0	0	4	0	0	0	0	0	0
R161	0	-	-	-	-	-	-	-	-	-	-	-	-
R176	0	-	-	-	-	-	-	-	-	-	-	-	-
R2101	0	-	-	-	-	-	-	-	-	-	-	-	-
R2108	0	-	-	-	-	-	-	-	-	-	-	-	-
R2110	0	-	-	-	-	-	-	-	-	-	-	-	-
R2113	0	-	-	-	-	-	-	-	-	-	-	-	-
R2122A	0	-	-	-	-	-	-	-	-	-	-	-	-
R2122B	0	-	-	-	-	-	-	-	-	-	-	-	-
R2124	1	-	-	-	-	-	-	-	-	-	-	-	-
R280A	2	-	-	-	-	-	-	-	-	-	-	-	-
R292	1	-	-	-	-	-	-	-	-	-	-	-	-
R3127	1	-	-	-	-	-	-	-	-	-	-	-	-
R3129	0	-	-	-	-	-	-	-	-	-	-	-	-
R3137	1	-	-	-	-	-	-	-	-	-	-	-	-
R3138	1	-	-	-	-	-	-	-	-	-	-	-	-
R3138	1	4	0	0	0	1	3	0	0	0	3	0	0
R3139	0	-	-	-	-	-	-	-	-	-	-	-	-
R3145	1	-	-	-	-	-	-	-	-	-	-	-	-
R3153	0	-	-	-	-	-	-	-	-	-	-	-	-
R3157	2	-	-	-	-	-	-	-	-	-	-	-	-
R4159	2	-	-	-	-	-	-	-	-	-	-	-	-
R4160	0	-	-	-	-	-	-	-	-	-	-	-	-
R4161	0	-	-	-	-	-	-	-	-	-	-	-	-
R4162	1	-	-	-	-	-	-	-	-	-	-	-	-
R4163	0	-	-	-	-	-	-	-	-	-	-	-	-
R4164	0	-	-	-	-	-	-	-	-	-	-	-	-
R4165	0	-	-	-	-	-	-	-	-	-	-	-	-

Table A-1

Compiled Lotic Dataset for Paired Invertebrate Tissue Selenium and Aqueous Selenium and Sulphate Concentrations

Invertebrate Monitoring Station	Algae Coverage Category	Cattail Coverage Category	Chara Coverage Category	Burr Reed Coverage Category	Duckweed Coverage Category	Filamentous Algae Coverage Category	Grasses Coverage Category	Mares Tail Coverage Category	Pond Lily Coverage Category	Pondweed Coverage Category	Rushes Coverage Category	Sedges Coverage Category	Water Milfoil Coverage Category
R51	0	-	-	-	-	-	-	-	-	-	-	-	-
R5-1	-	-	-	-	-	-	-	-	-	-	-	-	-
R510	1	-	-	-	-	-	-	-	-	-	-	-	-
R517	1	-	-	-	-	-	-	-	-	-	-	-	-
R52	3	-	-	-	-	-	-	-	-	-	-	-	-
R53	0	-	-	-	-	-	-	-	-	-	-	-	-
R53	-	-	-	-	-	-	-	-	-	-	-	-	-
R54	0	-	-	-	-	-	-	-	-	-	-	-	-
R55	1	-	-	-	-	-	-	-	-	-	-	-	-
R59	1	-	-	-	-	-	-	-	-	-	-	-	-
R612	1	-	-	-	-	-	-	-	-	-	-	-	-
R614	0	-	-	-	-	-	-	-	-	-	-	-	-
R615A	1	-	-	-	-	-	-	-	-	-	-	-	-
R615B	1	-	-	-	-	-	-	-	-	-	-	-	-
R62	0	-	-	-	-	-	-	-	-	-	-	-	-
R635	1	-	-	-	-	-	-	-	-	-	-	-	-
R636	2	-	-	-	-	-	-	-	-	-	-	-	-
R636	2	-	-	-	-	-	-	-	-	-	-	-	-
R644	0	-	-	-	-	-	-	-	-	-	-	-	-
R651	0	0	0	0	0	0	4	4	0	0	0	0	0
R7109	0	-	-	-	-	-	-	-	-	-	-	-	-
R7114A	0	-	-	-	-	-	-	-	-	-	-	-	-
R7114B	0	-	-	-	-	-	-	-	-	-	-	-	-
R747	0	-	-	-	-	-	-	-	-	-	-	-	-
R748	0	-	-	-	-	-	-	-	-	-	-	-	-
R749	0	-	-	-	-	-	-	-	-	-	-	-	-
R751	0	-	-	-	-	-	-	-	-	-	-	-	-
R764	1	-	-	-	-	-	-	-	-	-	-	-	-
REFF	-	-	-	-	-	-	-	-	-	-	-	-	-
REFF	0	-	-	-	-	-	-	-	-	-	-	-	-
REFF	-	-	-	-	-	-	-	-	-	-	-	-	-
REFF	3	0	0	0	0	3	0	0	0	0	0	0	0
ELKO	-	-	-	-	-	-	-	-	-	-	-	-	-
T4	-	-	-	-	-	-	-	-	-	-	-	-	-
T4	-	-	-	-	-	-	-	-	-	-	-	-	-
T4	-	-	-	-	-	-	-	-	-	-	-	-	-
T4	-	-	-	-	-	-	-	-	-	-	-	-	-
T4	-	-	-	-	-	-	-	-	-	-	-	-	-
T4	-	-	-	-	-	-	-	-	-	-	-	-	-
T4	-	-	-	-	-	-	-	-	-	-	-	-	-
T4	-	-	-	-	-	-	-	-	-	-	-	-	-
T4	-	-	-	-	-	-	-	-	-	-	-	-	-
TN	-	-	-	-	-	-	-	-	-	-	-	-	-
TN	-	-	-	-	-	-	-	-	-	-	-	-	-
TN	-	-	-	-	-	-	-	-	-	-	-	-	-
TN	-	-	-	-	-	-	-	-	-	-	-	-	-
TN	-	-	-	-	-	-	-	-	-	-	-	-	-
T2	-	-	-	-	-	-	-	-	-	-	-	-	-
T2	-	-	-	-	-	-	-	-	-	-	-	-	-
T2	-	-	-	-	-	-	-	-	-	-	-	-	-
T2	-	-	-	-	-	-	-	-	-	-	-	-	-
RL1	-	-	-	-	-	-	-	-	-	-	-	-	-
SEROX	3	1	3	0	0	3	4	0	0	3	0	0	0
SEROX	3	1	3	0	0	3	4	0	0	3	3	3	0
SEROX	3	1	3	0	0	3	4	0	0	3	3	3	0
SEROX	3	1	3	0	0	3	4	0	0	3	3	3	0
EV_SMCW	-	-	-	-	-	-	-	-	-	-	-	-	-
SMCIM	0	1	3	4	0	0	3	0	0	1	0	3	4
SMCIM	0	1	0	0	0	0	4	0	0	0	0	0	4
SMCIM	0	1	0	0	0	0	4	0	0	0	0	0	4
SMCIM	0	1	3	4	0	0	3	0	0	1	0	3	4
STPD	-	-	-	-	-	-	-	-	-	-	-	-	-
STPD	1	0	4	0	0	1	1	0	0	0	0	0	0
STPD	1	0	4	0	0	1	1	0	0	0	0	0	0
STPD	4	0	4	0	0	4	1	0	0	0	0	0	0
SWWL	-	-	-	-	-	-	-	-	-	-	-	-	-
THPD	-	-	-	-	-	-	-	-	-	-	-	-	-
UPBEC	0	0	0	0	0	0	3	0	0	0	0	3	0
UPBEC	0	0	0	0	0	0	3	0	0	0	0	3	0
UPGHC	1	0	0	0	0	1	3	0	3	0	0	0	3
WPEF	3	1	1	0	0	3	4	0	0	0	0	0	0
WWER	3	0	0	1	0	3	3	1	0	0	0	0	0
WWER	3	0	0	1	0	3	3	1	0	0	0	0	0
WWRBP	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes: "-" = not available; ">" = below the laboratory detection limit; % = percent; mV = millivolts; mg/kg dw = milligrams per kilogram dry weight; mg/L = milligrams per litre; ug/L = mic

DO = dissolved oxygen; ORP = Oxidative-reductive potential; TOC = total organic carbon

EVWQP = Elk Valley Water Quality Plan

ATTACHMENT B

Supplementary Habitat Characteristic Plots

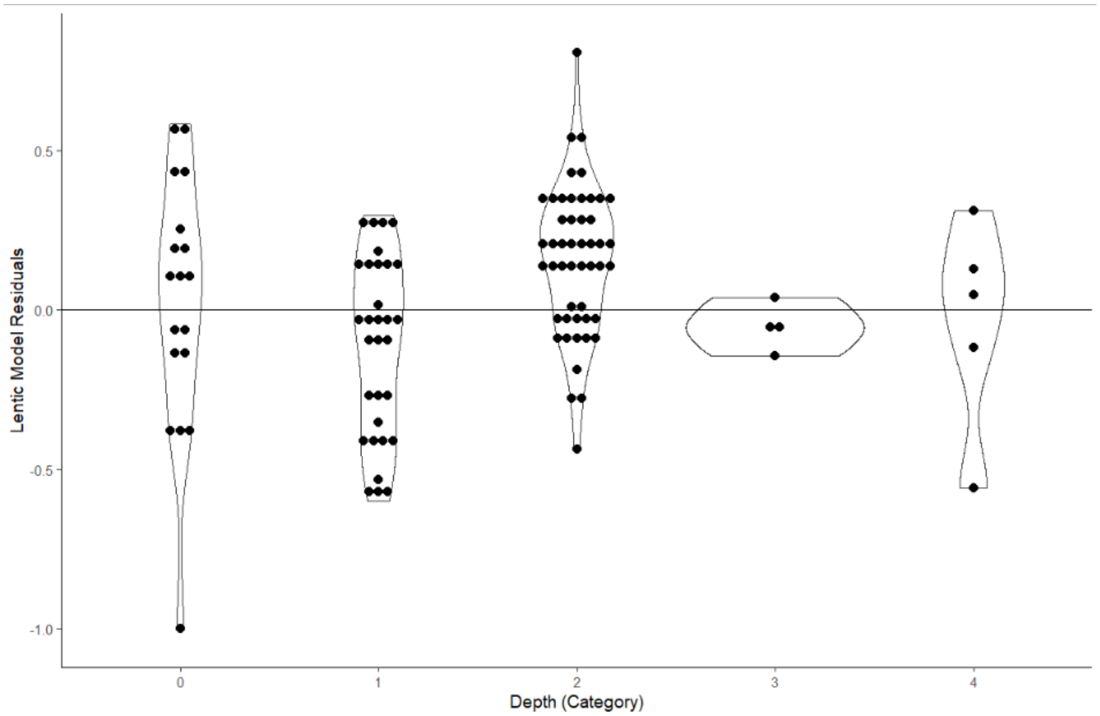

Figure B-1: Violin plot of the distribution of model residuals for an OLS regression model using all available lentic data for each category of maximum water depth.

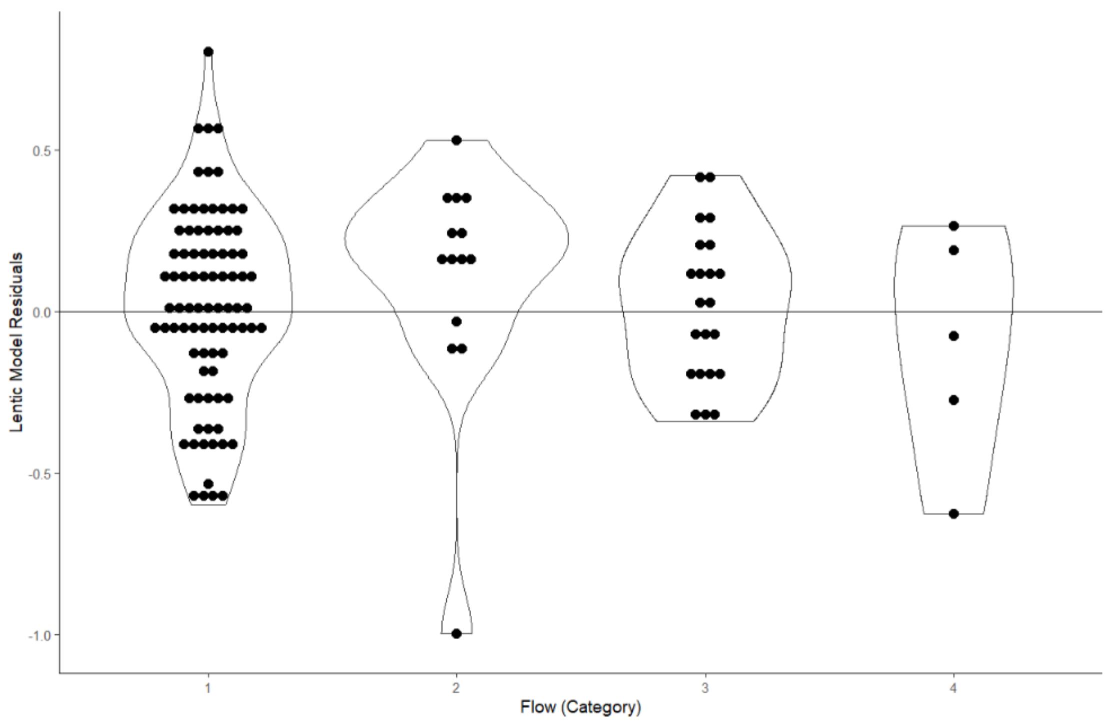

Figure B-2: Violin plot of the distribution of model residuals for an OLS regression model using all available lentic data for each category of flow.

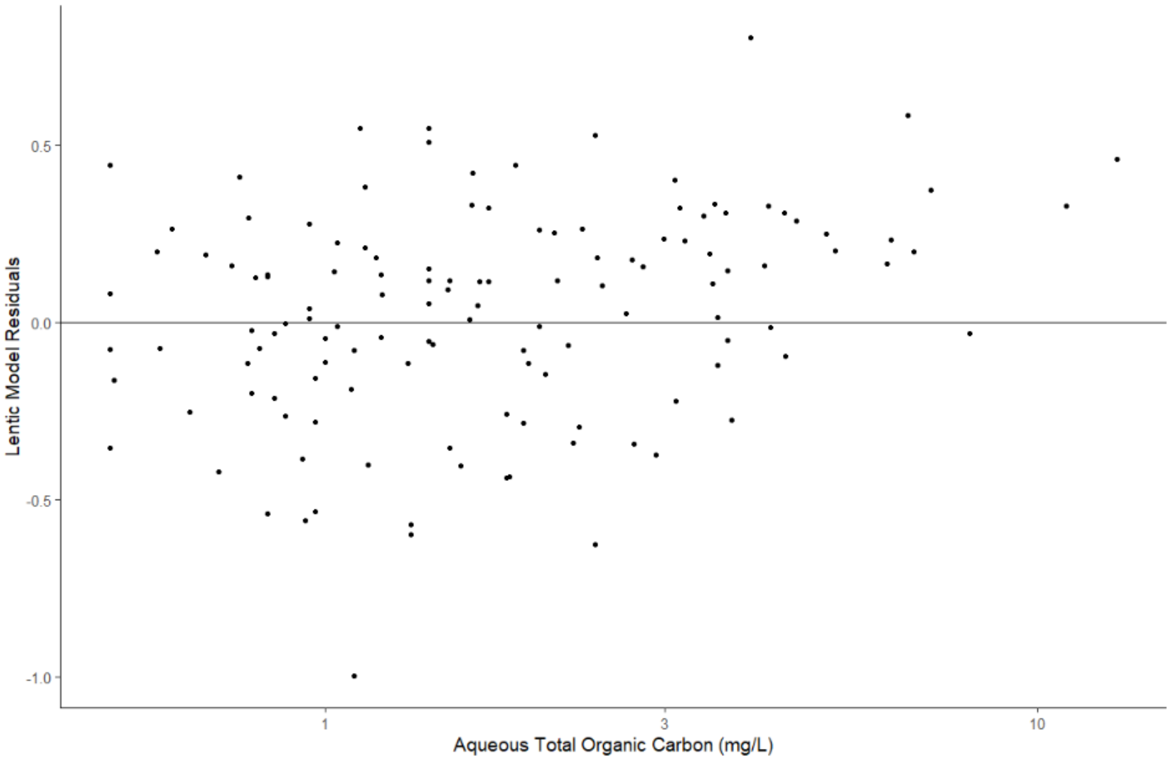

Figure B-3: Scatterplot of model residuals for an OLS regression model using all available lentic data over the range of measured aqueous total organic carbon concentrations (mg/L)

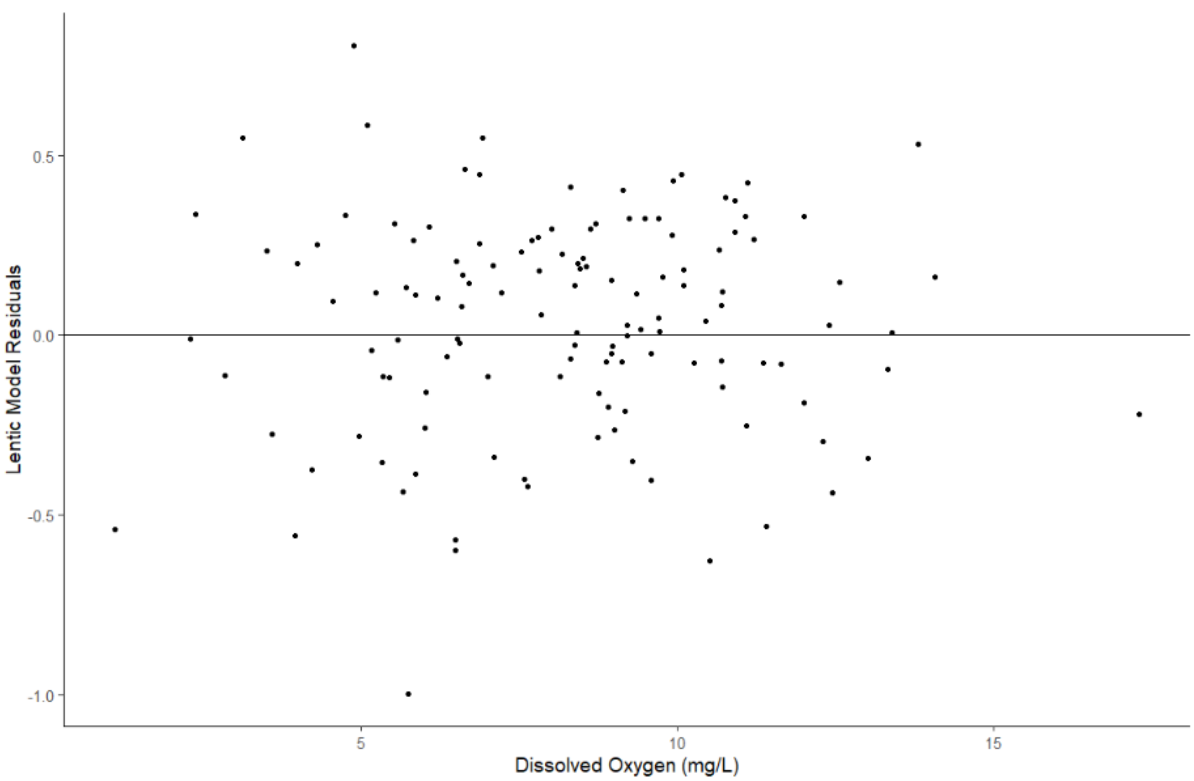

Figure B-4: Scatterplot of model residuals for an OLS regression model using all available lentic data over the range of measured dissolved oxygen concentrations (mg/L)

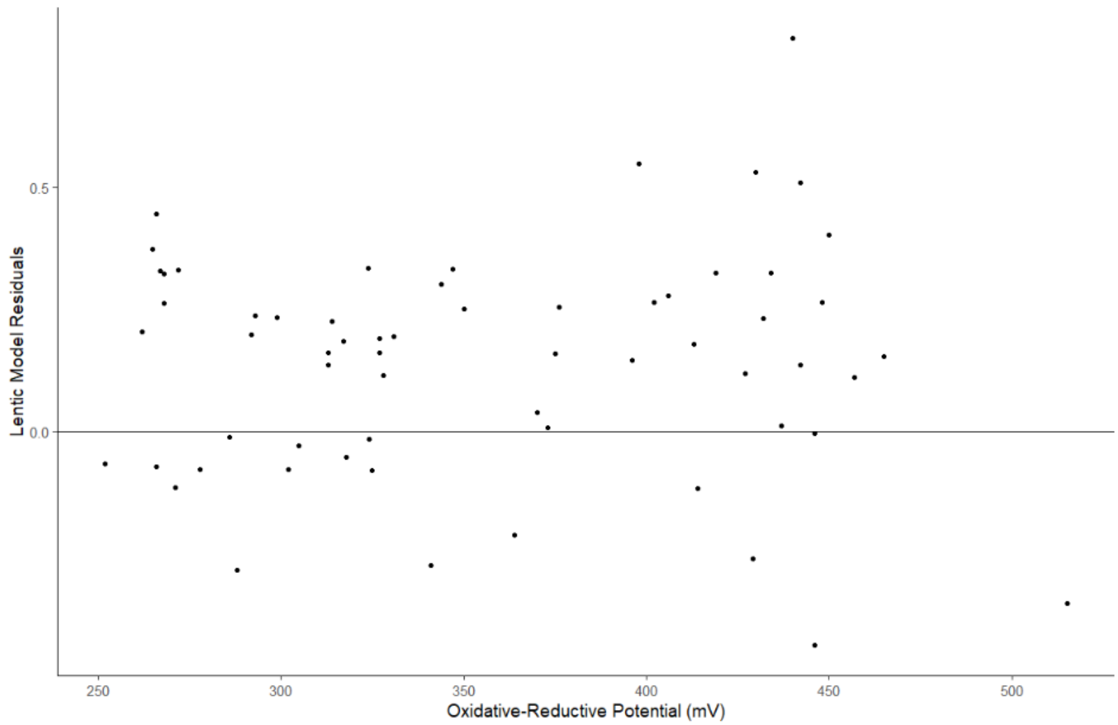

Figure B-5: Scatterplot of model residuals for an OLS regression model using all available lentic data over the range of laboratory measured oxidative-reductive potentials (mV)

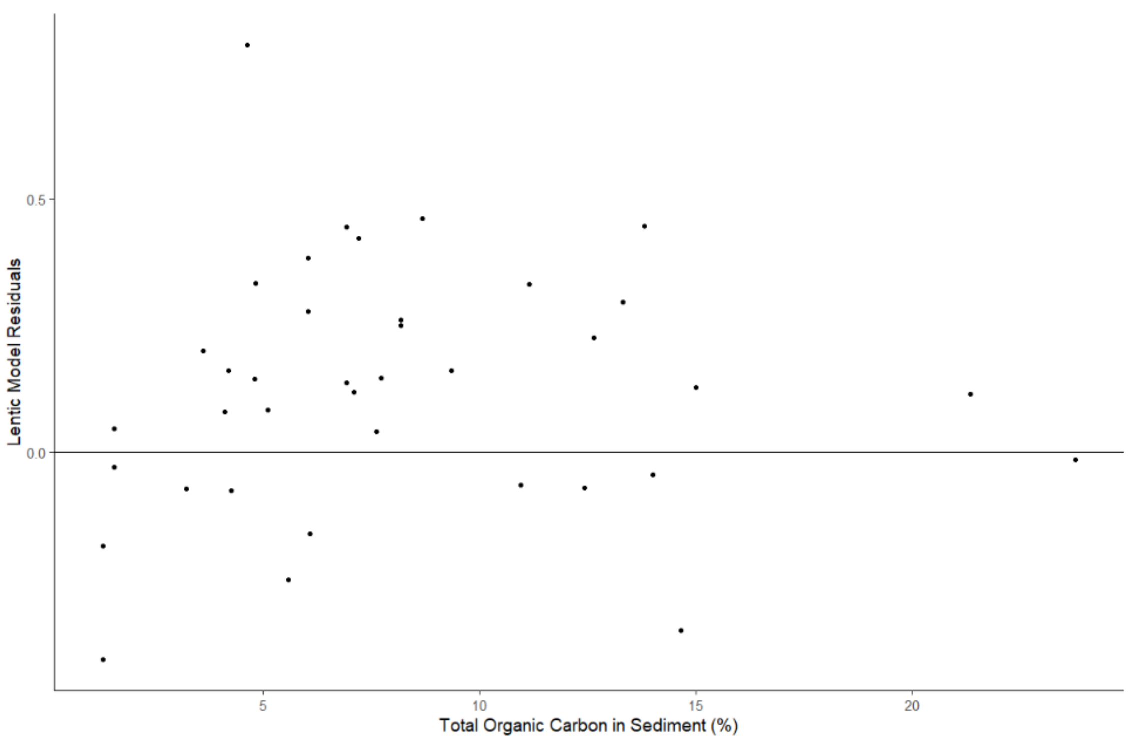

Figure B-6: Scatterplot of model residuals for an OLS regression model using all available lentic data over the range of measured sediment total organic carbon concentrations (%)