THE IMPACT OF STREAM RESTORATION ON MACROINVERTEBRATE COMMUNITIES IN AN URBAN FORESTED WATERSHED

by

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ABSTRACT

JACQUELINE HARTMAN. The impact of stream restoration on macroinvertebrate communities in an urban forested watershed. (Under the direction of DR. SANDRA CLINTON).

Stream restoration can lead to improved habitat quality, increased macroinvertebrate abundance and diversity, and reduced concentrations of nutrients and contaminants. Macroinvertebrates are vital in connecting the food web and breaking down organic matter to provide energy for higher trophic levels. Not only are macroinvertebrates important for the function of stream ecosystems but they also serve as biotic indicators of stream health. Based on species presence and abundance practitioners can determine if the stream water quality is ‘poor’ or ‘excellent.’ To study the impact of stream restoration on macroinvertebrate communities, a multi-year project at Reedy Creek Reserve was designed. The Reedy Creek watershed is a 14 mi2 urban forested watershed located in a nature preserve. Within the headwaters of the watershed, 5 sub-watersheds were delineated based on the surrounding land-use influence of development (D2, D1), forested control with restoration (C1), forested control without restoration (C2), pond (P1), agricultural (A4, A3, A3, A1) and Reedy (R2, R1). Taxa richness, EPT richness, total abundance, the North Carolina Biotic Index (NCBI), and EPT biomass were measured to study the impact of stream restoration on macroinvertebrate communities. A Before-After-Control-Impact study design was used to determine if restoration had a significant impact on the study metrics. Data collection in this study included summer 2016 through summer 2020. Restoration began in December 2017 and was completed in February 2019. After restoration, abundance and NCBI values increased at all sub-watersheds. For the development sub-watershed, taxa richness was significantly different after restoration with averages increasing from 5-8 taxa and abundance was significantly different with averages increasing from 29 to 87 total organisms after restoration. For the agricultural sub-watershed, taxa richness was significantly different after restoration with averages decreasing from 10 to 8 taxa, EPT richness was significantly different after restoration with averages decreasing from 4 to 3 taxa, and the NCBI score was significantly different after restoration with the average NCBI score increasing from 5.55 to 6.98 reflecting a change in water quality from ‘good-far’ to ‘poor’ after restoration. For the forested control sub-watershed, there was no change in taxa richness (13 taxa), EPT richness (6 taxa), abundance (58 total organisms), and NCBI score (4.65/Good) after restoration. Changes in land-use led to different patterns among biotic metrics that are sensitive to environmental variation such as taxa richness, EPT richness, and NCBI. During the time frame of this study, even though patterns were observed there were very few statistically significant differences that were contributed to the fact that the restoration project is still new (2-3 years depending on the site). Practitioners suggest it can take upwards of 10 years for a stream to recover after restoration. To correctly assess the outcome of stream restoration projects, multiple years of pre-restoration and post-restoration data are needed.

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SECTION 1: INTRODUCTION

1.1: Macroinvertebrate Communities

A macroinvertebrate is an animal lacking a backbone and is large enough to be seen with the naked eye. Macroinvertebrates are composed of aquatic insects including Ephemeroptera (mayflies), Plecoptera (stoneflies), Trichoptera (caddisflies), Odonata (dragonflies), Diptera (true flies), Coleoptera (beetles) but also include snails, worms, leeches, and crayfish. Aquatic insects are commonly associated with the stream benthos or submerged along the sides of the stream channel. Macroinvertebrates also reside for long periods (few months to three years) in the aquatic larvae stage before the relatively short aerial stage as an adult (NCDEQ 2016). Macroinvertebrates belong to every freshwater ecosystem and serve many important functions. One important function is that they serve as a link in freshwater food webs and provide a food source for fish, birds, reptiles, and amphibians (Michaluk 2019). Macroinvertebrates also break down organic matter into forms of energy that can be consumed by other animals (Michaluk 2019).

Macroinvertebrates are commonly used as biotic indicators to assess river health and water quality of many stream restoration projects. The presence or absence of macroinvertebrates can give a biological indicator score of stream health by using the North Carolina Biotic Index Formula (Equation 1). Monitoring for these purposes focuses on the aquatic insect larvae stage as this life stage is longer and the organisms are easier to collect. Macroinvertebrates typically have reduced mobility in the aquatic insect larval stage and thus reflect the ecological conditions at the site assessed (Ligeiro et al. 2014). The life cycle of macroinvertebrates allows scientists to observe fluctuations in water quality between sampling events and to detect the effects of both short-term and long-term environmental conditions (NCDEQ 2016).

The south-eastern Piedmont region consists of gently rolling hills, deeply eroded valleys, and a warm temperate climate (Mullholland and Lenat 1992). Most Piedmont streams have been impacted by historical land-use changes as this region was one of the first to be highly impacted by European settlers through the act of forest clearing and farming practices (Mullholland and Lenat 1992). This region was historically intensive in farming practices which has "impacted rivers through increased suspended sediment loads, elevated nutrient inputs, and pesticide runoff" (Grubaugh and Wallace 1995). The 'typical' macroinvertebrate community composition in south-eastern Piedmont streams is not well documented. Research studies that compare macroinvertebrate community composition in streams of agricultural land-use and reference streams conclude there is lower taxa richness in streams influenced by agricultural land-use and especially the Ephemeroptera, Plecoptera, and Trichoptera taxa (Grubaugh and Wallace 1995).

Macroinvertebrates have different tolerance levels to changes in the environment and respond to a broad gradient of anthropogenic disturbances depending on the species (Ligeiro et al. 2014). Each species is assigned a unique tolerance value on a scale from 0 to 10 with a value of 0 indicating no tolerance and a value of 10 indicating the organism is very tolerant to pollution and low concentrations of dissolved oxygen suggesting degraded water quality. Streams with excellent or good water quality bioclassification will contain a community of diverse, stable, and pollution-sensitive aquatic macroinvertebrates (NCDEQ 2016).

The Ephemeroptera, Plecoptera, and Trichoptera (EPT) macroinvertebrate taxa are often used to assess stream health due to their sensitivity to changes in environmental and headwater parameters (Figure 1). Macroinvertebrates are intolerant to low levels of dissolved oxygen, high water temperature, high sediment and nutrient concentrations, and toxic chemicals and pollutants. Non-impacted stream ecosystems indicate excellent stream quality with macroinvertebrate community composition being diverse and dominated by pollution sensitive organisms; including the EPT taxa that is generally intolerant of degraded stream quality and are often absent in urban streams (Reif 2002). For example, a study performed in the rivers of Gunung Jerai Forest Reserve in northern Malaysia reported that that streams having an EPT taxa richness greater than 10 indicated the streams were not impacted and therefore had ‘good’ water quality. (Hamid and Rawi 2017). Another study researched the impacts of land-use on macroinvertebrates of three North Carolina piedmont streams and discovered that Ephemeroptera taxa were most abundant at the forested site, Chironomidae were most abundant at the agricultural site, and Oligochaeta were most abundant at the urban site (Lenat and Crawford 1994). These results are indicative that forested streams have greater water quality than streams impacted by urban and agricultural land-use influences as intolerant taxa (EPT) are more abundant in forested streams. Therefore, measuring EPT richness and EPT biomass is an accurate variable to measure to detect aquatic disturbances as these taxa depend on good ranges of environmental parameters that indicate healthy stream ecosystems (Hamid and Rawi 2017). For my research, biomass was only calculated for the EPT taxa as they are the most abundant macroinvertebrate taxa, are sensitive to change in environmental parameters, and due to the amount of time it will take to calculate biomass. Currently, Reedy Creek has a community of 'good' macroinvertebrates (EPT) to potentially colonize the watershed post-restoration that are available for biomass calculations.

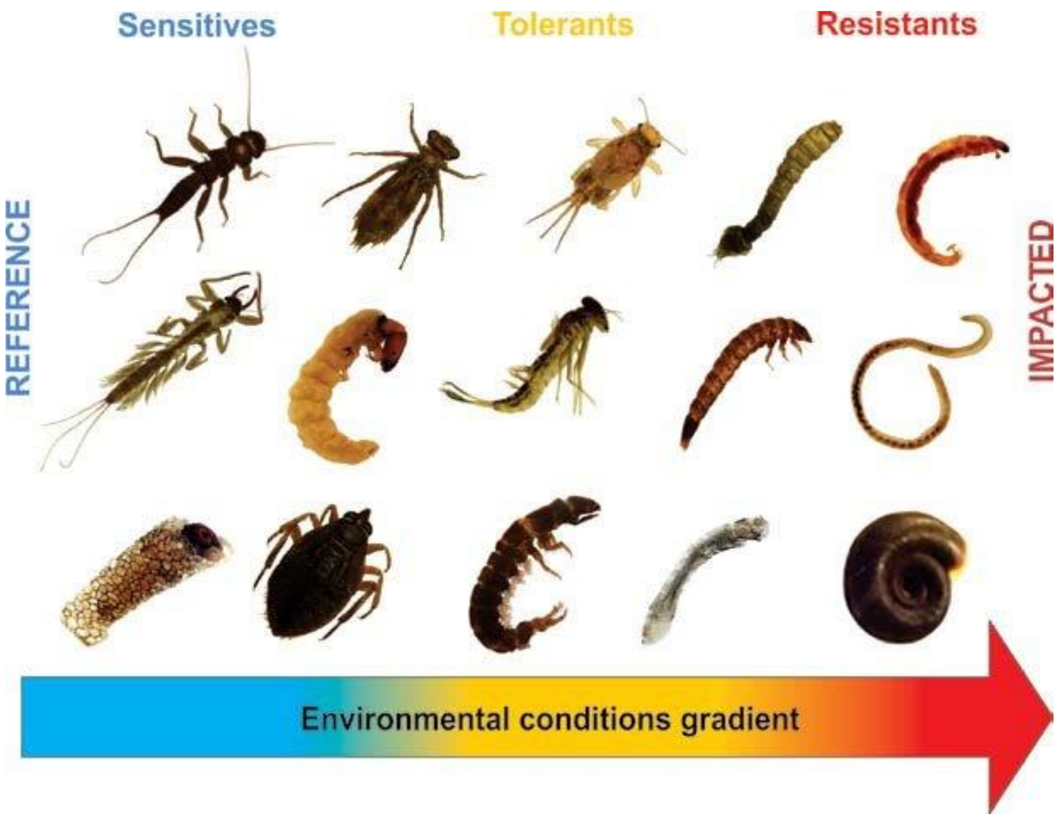

Figure 1. Conceptual diagram for visualizing macroinvertebrate taxa that are sensitive (Ephemeroptera, Plecoptera, Trichoptera) and resistant (Diptera, Gastropoda) to environmental gradients (De Morais et al. 2014).

Most of the macroinvertebrate literature typically measures the impact of land-use change on macroinvertebrate communities in terms of richness, diversity, abundance, percent composition, and biotic index values. Currently in urban stream literature, measuring the biomass of macroinvertebrate community composition is not well documented. Biomass refers to the total mass of organisms in a given area and it is an important variable to measure as it can give an idea of the state of the ecosystem. For instance, biomass can determine the amount of energy that is available for the next trophic level and can determine the number of species it can support depending on the amount of energy that is available (Ada 2010). A study performed in the Piedmont Streams of Georgia concluded that urbanization reduced biomass due to multiple physical and chemical stressors that impact the structure and functions of stream ecosystems (Sterling et al. 2016). This study found that biomass decreased as percent impervious surface cover increased and that biomass increased as percent of canopy cover increased (Sterling et al. 2016). Even though these articles do not highlight changes in macroinvertebrate communities over time across different land-use types, they do highlight general trends in macroinvertebrate biomass across forested and urban stream ecosystems. This provides a need for more research to provide seasonal patterns of macroinvertebrate biomass across changing land-use types, as it is not well documented.

1.2: Urban Ecology

Urban areas are growing at an exponential rate which can be attributed to the worldwide population migration trend to move from rural areas to greater developed areas as well as the increasing transformation of rural areas to developed cities, which is referred to as urban sprawl. Most population growth is expected in the expansion of existing urban areas as the population in urban areas is increasing faster than that of the total population (Brown et al. 2005). According to The Population Division of the Department of Economic and Social Affairs (United Nations 2019), 55% of the world's population resided within urban areas in 2018 and it is anticipated within the next 30 years 68% of the world's population will reside within an urban area. The migration trend of moving from rural to urban areas has been exponentially great in Charlotte, North

Carolina. In 2010, Charlotte had a population of 731,424 which has increased by 24.7% with the population of Charlotte currently being 912,096 making it be the largest city in North Carolina (Charlotte Population 2021). For this study, the study region is located within the Reedy Creek Nature Preserve in the east-central portion of Charlotte, NC. In this area, the population was 8,274 in 1990 and has now grown more than three times with the population being at 27,023 in 2010 (Reedy Creek n.d.). As population growth continues at an exponential rate in urban areas, it is critical to understand the impact urbanization has on ecosystems as increases in population can drastically impact stream ecosystems draining urban land-use (Jones and Clark 1987).

The impact urbanization has on stream ecosystems is referred to as the ‘urban stream syndrome’ where urban streams are often are characterized by having an altered channel morphology, flashier hydrographs, increased concentrations of nutrients and contaminants, impaired water quality, decreased biodiversity, and are highly degraded due to increased erosion in stream banks (Walsh et al. 2005). Water quality refers to the chemical, physical, and biological characteristics of water to measure if the water is ‘good’ or ‘bad’ in quality. Common water quality parameters include temperature, dissolved oxygen, pH, and conductivity. These four water quality parameters were recorded seasonally at 11 surface water sites established in the Reedy Creek watershed. Temperature fluctuates seasonally with the normal range being between 6-20°C. Temperature is critical because it governs chemical and biological processes. Most aquatic species can survive within a limited temperature range in which temperature will affect metabolism, growth, and reproduction of many organisms. Dissolved oxygen measures the amount of free oxygen in the water with the normal range being 0-20 mg/L.

Aquatic insects need dissolved oxygen to survive which will vary seasonally and typically decreases with higher temperatures (Water Quality Indicators 2019). pH measures the hydrogen ion (H+) concentration in water with the normal range being from 4-6. Water pH affects biological and chemical processes as aquatic life needs a specific pH range to perform biological processes (Water Quality Indicators 2019). Conductivity is the concentration of ions in the water and measures the ability to conduct an electric current with normal ranges being 150-250 µS/cm.

Due to streams' low-lying position in the landscape, urban streams are particularly vulnerable to impacts associated with land cover change that come with changes due to urbanization that are largely driven by stormwater runoff. As urban areas continue to grow and expand so does the amount of impervious surface cover and the amount of stormwater runoff. With the increase in stormwater runoff and impervious surface cover, rainwater reaches the river faster and increases the probability flooding will occur. This increase in discharge causes stream banks to be highly channelized and alters the morphology of the streams. Overall, humans have altered the use of the landscape thus altering a great portion of natural systems leading to a loss of biodiversity and comprising ecosystem function (Sundermann et al. 2011).

Urbanization disrupts macroinvertebrate habitat and thus leads to a reduction in species richness and impairs the stream water quality. Roy et al. (2003) studied stream macroinvertebrate response to catchment urbanization and found that urban land cover was negatively correlated to taxa richness and biotic indices that reflected good water quality and resulted in less diverse and more tolerant stream macroinvertebrate communities. Urban streams have a degraded biological function and the macroinvertebrate community composition typically has a decrease in sensitive species, an increase in tolerant species, reduced diversity, and overall reduced biotic richness (Roy et al. 2003; O'Driscoll et al. 2010). In addition to hydrological alteration, urban watersheds impact macroinvertebrate communities due to the added chemical stressors and altered food availability. Urbanization negatively impacts macroinvertebrate community composition as increased % impervious surface cover and nutrient concentrations leads to a decline in macroinvertebrate biomass, especially the sensitive taxa (Sterling et al. 2016). It is commonly seen that land-use changes in stream ecosystems leads to a reduction in diversity causing the community to be more homogeneous (O'Driscoll et al. 2010). Previous research on stream ecosystems in Georgia found that urban stream catchments were composed of tolerant taxa and were more homogeneous in community composition (O'Driscoll et al. 2010). The effect of land-use (forested, agricultural, urban) on macroinvertebrate taxa in three North Carolina Piedmont streams discovered that for the agricultural site, a reduction in sensitive taxa was offset by an increase in tolerant taxa indicating the community composition became more homogeneous (Lenat and Crawford 1994). The same study also discovered that macroinvertebrate taxa richness showed "moderate stress (fair water quality) at the agricultural site and severe stress (poor water quality) at the urban site" (Lenat and Crawford 1994). Following restoration of the Reedy Creek watershed, it is predicted that there will be greater taxa richness and greater biomass due to the altering channel morphology and restoring the stream to a lesser degraded system.

1.3: Restoration

Currently, more than one-third of the rivers in the U.S. are listed as impaired or polluted and are most likely in need of restoration (Bernhardt et al. 2005). In North Carolina, this trend is continuing as the 303(d) list of impaired waters is growing and the most updated list includes an additional 1,250 miles of impaired streams that were not reported in previous years (Administrative Watch 2019). Restoration is a method to restore degraded ecosystems to that of a lesser disturbed state and to restore the structure and function of the system. Ecosystem restoration is not only a way of mitigating detrimental impacts of humans on natural ecosystems, but also as a means of preventing the loss of biodiversity. Running waters are among the most impacted ecosystems in the world due to increased runoff and ISC, and restoration is a key component to returning these systems to that of a pre-disturbed state (Louhi et al. 2011). Some common goals of stream restoration include stabilize eroding stream banks, return the natural stream pattern, improve habitat, enhance water quality, and preserve aquatic life. Investing efforts into stream restoration projects are not only beneficial for the ecosystem but also for our society and well-being. In the United States, most urban land is in the 100-year flood zone; therefore, restoration of wetlands in urban areas can reduce loss of life and property from floods (Bernhardt and Palmer 2007).

Previous stream restoration projects have been performed at the small scale (<1 km stream length) and did not consider land-use changes (Bernhardt et al. 2005). Land-use changes are known to strongly influence macroinvertebrate communities due to the alterations in hydrological, chemical, and physical characteristics (Lenat and Crawford 1994; Jones and Clark 1988; Sterling et al. 2016). One study conducted in the Piedmont province of Maryland studied macroinvertebrate community composition in small watersheds that had similar characteristics but differed according to land-use and discovered taxa richness was the highest in forested land-use, lowest in residential (urban) land-use, and streams with agricultural land-use had taxa richness values between that of forested and residential land-use (Klein 1979). However, restoration projects performed at the small scale make it difficult to assess the true benefits restoration can have for stream ecosystems.

Our study region, Reedy Creek Nature Preserve, was performed at the whole watershed-scale and considered land-use changes to understand the impacts of urban stream restoration on ecosystem function. Reedy Creek was listed on the 303(d) list for impairments related to biological integrity and thus needed restoration. Reedy Creek was in a degraded condition as the banks were actively eroding. Stream bank erosion caused the stream channel to be highly incised and results in fine sediments, such as clay, loading into the stream and is thus bad for water quality and habitat for macroinvertebrates. During the construction, it was priority to save as many of the trees. However, a lot of trees were lost due to progressive erosion along the stream banks but were replaced with shrubs and trees. The initial restoration goal was to reconnect the streams in the watershed to their associated floodplains which was accomplished by raising the streambed 5-10 feet and constructing riffle-pool morphology. The streams were restored to their natural shape, flow, and location in the landscape. We predicted that reconnecting the streams to their associated floodplain would enhance water quality and lead to greater species richness across the watershed as the success of stream restoration has commonly been evaluated based on biotic factors.

SECTION 2: OBJECTIVE

The objective of this research was to evaluate the impact restoration of an urban forested watershed has on 1) macroinvertebrate community composition; 2) biomass of Ephemeroptera, Plecoptera, and Trichoptera (EPT) taxa; and 3) water quality as measured using the North Carolina Biotic Index (NCBI).

SECTION 3: QUESTIONS

(1) How does macroinvertebrate community composition respond to restoration across different land-use types?

(2) How does Ephemeroptera, Plecoptera, and Trichoptera (EPT) taxa biomass vary after restoring an urban forested watershed?

SECTION 4: HYPOTHESES

(1) How does macroinvertebrate community composition respond to restoration across different land-use types?

H_a: Restoring urbanized streams will result in an increase in species richness and a decrease in North Carolina Biotic Index (NCBI) scores indicating an improvement in water quality as restoration results in improved habitat that allow sensitive taxa to thrive under the improved environmental conditions.

H_0: Restoring urbanized streams will have no impact on species richness and no change in NCBI scores. Restoration may decrease richness and increase NCBI scores due to the disturbance from construction.

(2) How does Ephemeroptera, Plecoptera, and Trichoptera (EPT) taxa biomass vary after restoring an urban forested watershed?

H_a: Restoring urbanized streams will result in an increase in biomass and richness of Ephemeroptera, Plecoptera, and Trichoptera (EPT) taxa as restoration improves habitat by decreasing the concentration of nutrients and chemicals as well as returning the natural stream pattern which both have positive effects on biomass and richness.

H_0: Restoring urbanized streams will have no impact on the biomass and richness of EPT taxa.

SECTION 5: METHODS

5.1: Study Area

The study area for this project is located within the Reedy Creek watershed in east-central Mecklenburg County, North Carolina (Figure 2). The 14 square miles (~36 square kilometer) Reedy Creek watershed drains into the Yadkin-Pee Dee River watershed in Cabarrus County, North Carolina. The Reedy Creek watershed is mostly forested with neighboring land-uses being predominantly residential or underdeveloped (Nature Preserve Information 2021). The watershed topography at the watershed consists of gentle rolling hills with elevation ranging from “650 feet at the floodplain of Reedy Creek along the eastern property line to over 800 feet on the ridge tops along Plaza Road Extension to the south” (Nature Preserve Information 2021). Vegetation consists of native wildflowers, broad beech ferns, and the endangered Georgia aster *(Symphyotrichum georgianum)* (Nature Preserve Information 2021). Background environmental characteristics are provided in Table 1 and Table 2.

The Reedy Creek watershed was deemed impaired due to lack of diversity of aquatic insects as well as significant erosion and sediment loads. The restoration construction was completed by Wildlands Engineering, which is an ecology focused design-build engineering firm. In November of 2017, restoration began in the upper stream reaches with progress continuing downstream and was completed at the mainstem of the watershed (Figure 4). After 15 months, the restoration was completed in February 2019 with aims of restoring the Reedy Creek watershed to a healthy stream system by reconnecting the streams to their associated floodplains. This was accomplished by effectively raising the streambed 5-10 feet because it was highly eroded. A riffle-pool morphology was constructed, and the channel morphology altered to be more sinuous. Overall, the construction resulted in roughly 5 acres (~0.02 square kilometer) of wetland enhancement, 40,000 feet (~12 kilometers) of restored stream, and 45, 268 native trees and shrubs were planted (Reedy Creek Stream Restoration 2018). The restoration timeline can be seen illustrated in Figure 4 and Table 3.

The watershed was divided into five sub-watersheds based upon surrounding land-uses of agriculture (A1, A2, A3, A4), urban residential development (D1, D2), pond influence (P1), mainstem (R1, R2), and forested control with restoration (C1), and forested control without restoration (C2) (Figure 3). Sampling occurred at 11 established biomonitoring sites in the headwaters located in the preserve. The forested control sub-watershed was originally not scheduled for restoration as it did not have the characteristics of a typical urban stream and contained unique macroinvertebrate taxa. However, upon initial sampling of site C1 it was observed the flow at the confluence with the mainstem backwashes, the channel was highly incised, and there were few macroinvertebrates beyond midges (Chironomidae). Therefore, a second site in the forested control sub-watershed was established (C2) that resembled a non-impacted headwater stream and was not restored. Summary of seasonal sample collection dates, grouping season, and actual seasons for the entire duration of the Reedy Creek Restoration Project are detailed in Table 4. For analysis purposes, sampling events were categorized by low canopy cover and low surface water temperature (winter) and by high canopy cover and high surface water temperatures (summer) as an aim to increase the number of replicates for statistical analysis purposes (Table 5).

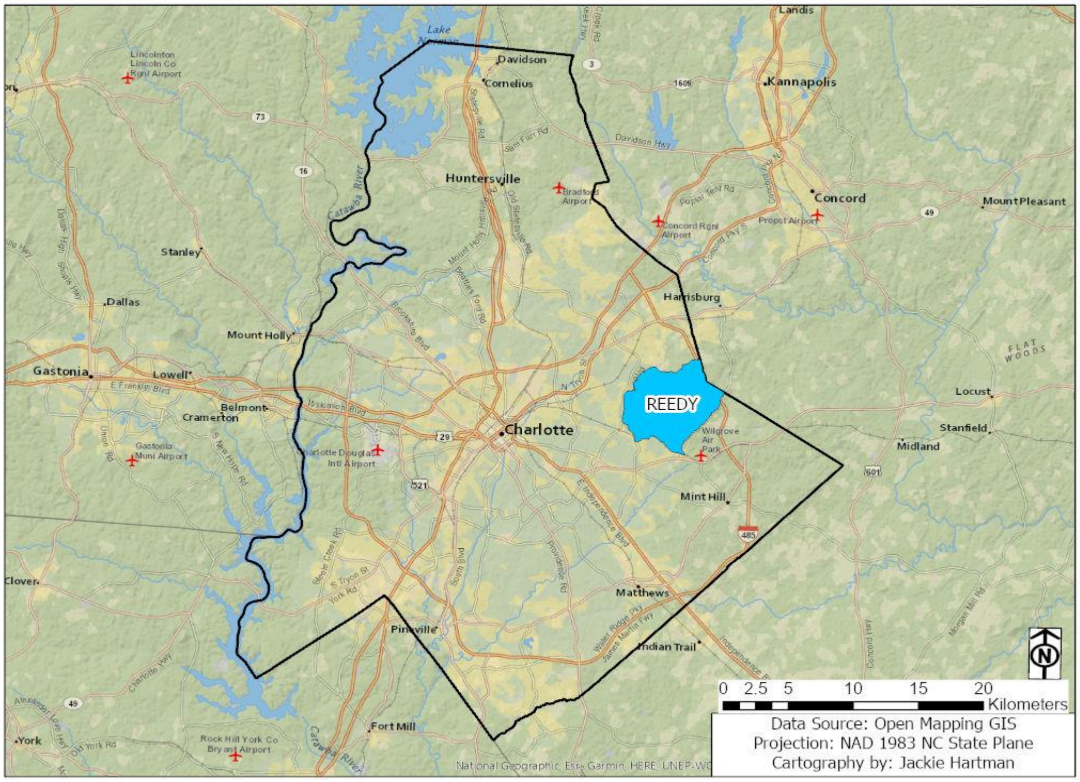

Figure 2. Location of the Reedy Creek Watershed within the county lines of Mecklenburg County, NC.

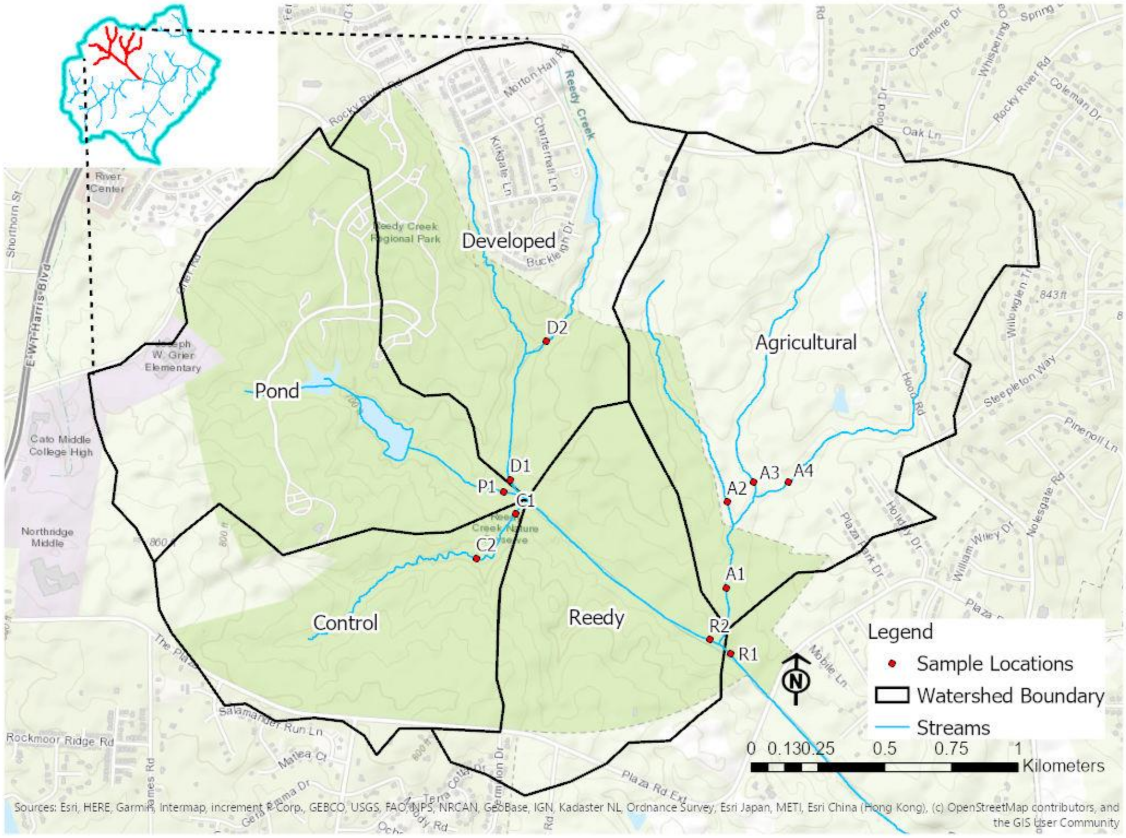

Figure 3. Location of the 11 established surface water sampling locations within the five sub-watersheds of the Reedy Creek Nature Preserve (Pond, Developed, Agricultural, Control, Reedy). The inset map illustrates the location of the five sub-watersheds within the Reedy Creek watershed.

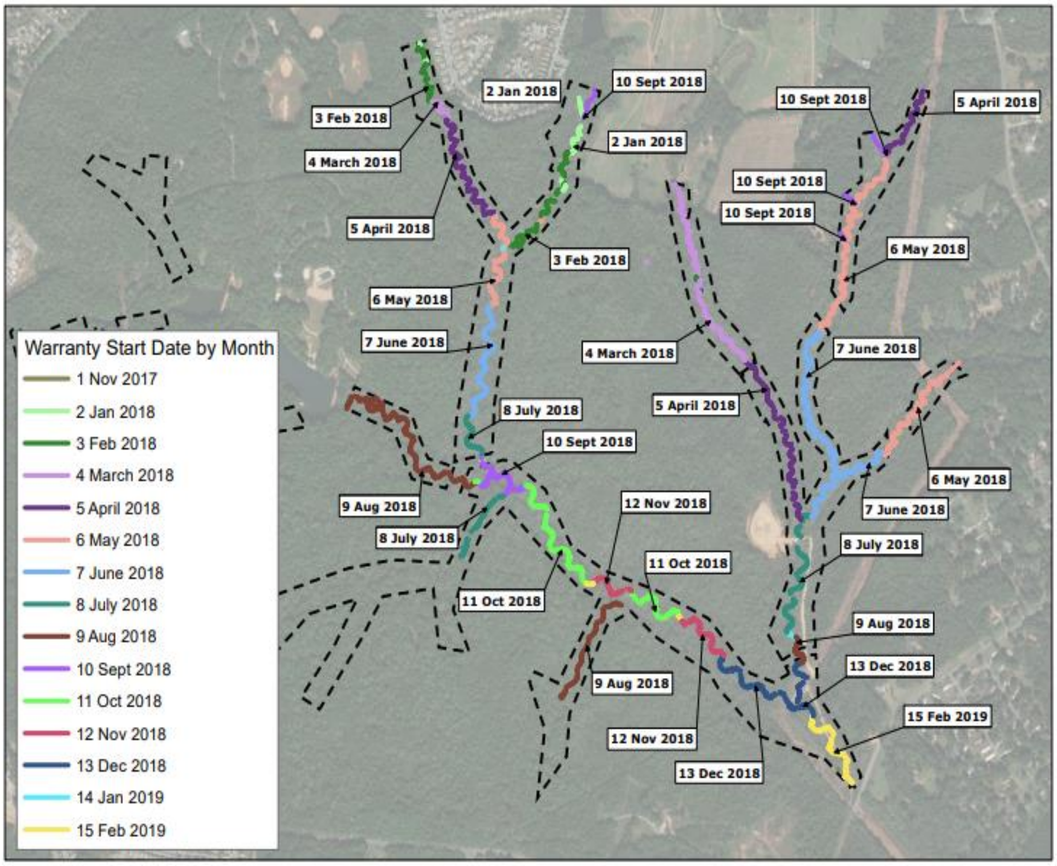

Figure 4. Dates of complete restoration along the Reedy Creek Watershed. (Wildlands Engineering 2019).

Table 1. Environmental characteristics of the development and historically agricultural influence sub-watersheds for 2016-2020 (mean ± standard error).

	Development		Agricultural			
Parameter	D2[a]	D1[b]	A4[c]	A3[d]	A2[e]	A1[f]
Temp (°C)	15.8 ± 7.0	16.6 ± 7.8	14.2 ± 7.1	14.6 ± 6.7	15.4 ± 7.1	15.6 ± 7.3
pH	6.7 ± 0.9	6.8 ± 0.8	6.5 ± 0.9	6.6 ± 0.6	6.6 ± 0.6	6.6 ± 0.7
SC (µS/cm)	145.7 ± 59.4	114.8 47.2	93.8 ± 31.1	116.4 ± 63.2	121.2 ± 45.9	115.1 ± 31.5
DO (mg/L)	7.9 ± 3.2	8.8 ± 2.6	8.8 ± 2.9	8.5 ± 3.5	8.2 ± 3.3	10.3 ± 2.6
Area (km^2)	0.27	1.15	0.55	0.6	0.48	1.9

[a]28 samples were collected for D2
[b]27 samples were collected for D1
[c]29 samples were collected for A4
[d]29 samples were collected for A3
[e]27 samples were collected for A2
[f]28 samples were collected for A1

Table 2. Environmental characteristics of the pond, Reedy, and forested control influence sub-watersheds for 2016-2020 (mean ± standard error).

	Pond	Reedy		Control	
Parameter	P1[a]	R2[b]	R1[c]	C1[d]	C2[e]
Temp (°C)	15.9 ± 7.0	15.9 ± 7.4	16.4 ± 6.9	16.4 ± 6.1	15.2 ± 5.6
pH	6.8 ± 0.9	6.8 ± 0.8	6.8 ± 0.7	6.8 ± 0.8	6.7 ± 0.5
SC (µS/cm)	87.3 ± 35.8	88.9 ± 24.29	98.8 ± 29.3	46.6 ± 11.1	51.7 ± 15.8
DO (mg/L)	9.0 ± 1.9	9.82 ± 2.49	9.5 ± 2.4	9.4 ± 1.5	9.4 ± 1.6
Area (km^2)	1.2	3.69	5.7	0.77	0.68

[a]26 samples were collected for P1
[b]27 samples were collected for R2
[c]28 samples were collected for R1
[d]12 samples were collected for C1
[e]28 samples were collected for C2

Table 3. Final restoration dates and watershed area for the established 11 surface water stream sites within the Reedy Creek Watershed. Restoration occurred from November 2017 until February 2019. Samples were collected seasonally in winter (February/March), fall (late October/early November), and summer (June/July). **Note C2 was a control site and therefore was not restored.*

Site	Area (km^2)	Start Restoration Date	Final Restoration Date	Last Pre-Restoration Sample	First Post-Restoration Sample
D2	0.27	12-06-2017	05-06-2018	Fall 2017	Fall 2018
D1	1.15	12-20-2017	07-08-2018	Fall 2017	Summer 2018
P1	1.18	06-13-2018	09-10-2018	Winter 2018	Fall 2018
C1	0.77	06-12-2018	07-08-2018	Winter 2018	Summer 2018
C2	0.68	*Not Restored	*Not Restored	*Not Restored	*Not Restored
A4	0.55	02-06-2018	06-07-2018	Fall 2017	Winter 2018
A3	0.60	03-31-2018	06-07-2018	Fall 2017	Winter 2018
A2	0.48	02-06-2018	04-05-2018	Fall 2017	Summer 2018
A1	1.90	01-19-2018	07-08-2018	Winter 2018	Fall 2018
R2	3.69	08-22-2018	12-13-2018	Summer 2018	Winter 2019
R1	5.70	12-19-2018	02-15-2019	Summer 2018	Winter 2019

Table 4. Summary of seasonal sample collection dates, grouping season, and actual seasons for the entire duration of the Reedy Creek Restoration Project. For analysis purposes, samples were combined into two season categories either *winter or summer*. Winter collected samples were grouped based on having low percent canopy cover and low surface water temperature (°C). Summer collected samples were grouped based on having high percent canopy cover and high surface water temperature (°C). **Note: C2 was not an original project site it was established later based on input from Wildlands Engineering to restore this stream segment. Other sites were not sampled for some seasons due to restoration construction.*

Date	Group Season	Actual Season	Sites Not Sampled
02/19/2016	Winter	Winter	C1
04/29/2016	Summer	Spring	C1
07/28/2016	Summer	Summer	
11/14/2016	Winter	Fall	C1
03/17/2017	Winter	Spring	
06/20/2017	Summer	Summer	C1
10/18/2017	Summer	Fall	C1
02/19/2018	Winter	Winter	C1, A2, D2, D1
08/16/2018	Summer	Summer	A1, P1, D2
11/08/2018	Winter	Fall	R2, R1
02/25/2019	Winter	Winter	
07/15/2019	Summer	Summer	
11/20/2019	Winter	Fall	
2/14/2020	Winter	Winter	
07/27/2020	Summer	Summer	

Table 5. For analysis purposes, samples were combined into two season categories either *winter or summer*. Mean ± standard error percent canopy cover, mean ± standard error temperature (°C), and the count (N) of sites included in analysis are provided.

SUMMER (HIGHCC/HIGHTEMP)				WINTER(LOWCC/LOWTEMP)			
DATE	CANOPY COVER	TEMPERATURE	N	DATE	CANOPY COVER	TEMPERATURE	N
4/29/2016	76 ± 11	17.15 ± 0.57	10	2/19/2016	14 ± 7	8.94 ± 1.64	10
7/28/2016	97 ± 12	23.95 ± 2.30	11	11/14/2016	22 ± 11	9.76 ± 1.02	10
6/20/2017	93 ± 9	21.21 ± 1.38	11	3/17/2017	NA	6.82 ± 3.09	11
10/18/2017	86 ± 16	12.05 ± 0.84	11	2/19/2018	21 ± 13	11.55 ± 0.76	8
8/16/2018	48 ± 28	23.69 ± 0.91	9	11/8/2018	41 ± 24	9.76 ± 1.02	9
7/15/2019	47 ± 24	25.91 ± 2.22	11	2/26/2019	49 ± 30	8.03 ± 1.42	11
7/28/2020	65 ± 20	25.65 ± 2.28	11	11/20/2019	57 ± 19	10.76 ± 1.32	11
				2/14/2020	44 ± 29	12.21 ± 1.19	11

5.2: Macroinvertebrate Communities

At all established 11 surface water sites (Figure 3), benthic macroinvertebrates were collected seasonally along 50m stream reaches pre-restoration and 100m stream reaches post-restoration (Table 6). Pre-restoration data was primarily collected by Sara Henderson (M.S. 2015) and Rebecca Black (M.S. 2019), recent graduates of the M.S. Earth Science program, and previous graduate students who have assisted working on the Reedy Creek Restoration and/or in the Clinton laboratory. In Fall 2019, I became a graduate assistant on the Reedy Creek Restoration Project and began assisting in the post-restoration sample collection process. For the purpose of this study, a modified version of the NC Qualitative Four Method was utilized as its purpose is to collect all representative macroinvertebrate taxa and will be assessed based upon small stream criteria (<3 km) in Piedmont streams.

One sweep net, one leak pack, one visual sample, and one chironomid sample were collected at all sites along the entire stream reach available. The sweep net method is a commonly used qualitative sampling technique and is used to perform a general assessment of aquatic insect taxa present and to make observations on relative abundance. A sweep net constructed of mesh netting (500 microns) was used to sample bank areas, root masses, and sandy areas through the action of disturbing sediment, dislodging rocks, and sweeping under the bank habitat with the net. Once the sediment was disturbed, the sweep net was placed downstream of the disturbed area to collect the organisms being swept by the current flow into the net. To collect the leaf pack sample, a variety of leaves will be collected along the stream reach. Target leaves include those containing suitable material for macroinvertebrate habitat and generally are a dark brown color. Freshly fallen leaves were not be collected. To collect the visual sample, a ten-minute visual search of macroinvertebrates along the stream bank habitat was performed. To collect the chironomid sample, submerged sticks were gathered and placed into a tub to then be mechanically washed. This was performed by splashing fresh water onto the stick to dislodge any macroinvertebrates. The sweep net and chironomid sample were strained into a fine-mesh sampler (300 microns) and the contents were placed into a Whirl-Pak containing 90% ethanol. The visual and leak pack samples will be placed into a separate Whirl-Pak each containing 90% ethanol. All samples were taken back to the lab and placed into jars containing 70% ethanol for preservation purposes.

In the laboratory, samples were sorted ("picked") and identified to the lowest taxonomic level as described in Merritt et al. 2008, Morse et al. 2017, and Tennessen et al. 2004. To reduce processing time, chironomids were identified to the family level (Chironomidae). To sort the samples, the ethanol was first drained from the jar into a hazardous waste container while ensuring no macroinvertebrates were lost from the sample. The remaining contents of the jar were placed into a plastic tub containing deionized (DI) water. The macroinvertebrates float to the top and were removed from the plastic tub and placed into a petri dish containing 70% ethanol. A final visual inspection was performed before properly disposing of the remaining debris and tub contents. Once identified under the Olympus SZX7 Stereomicroscope, the organisms were preserved in glass vials containing 70% ethanol.

Using equation 1, the North Carolina Biotic Index (NCBI) was calculated at each site seasonally (NCDEQ 2016). This equation uses species specific information to calculate a quantitative number that is used to bioclassify stream water quality based on difference collection methods and stream size. The NCBI ranges from 0.0 to 10.0 and indicates tolerance of macroinvertebrate communities to potential stressors with a lower NCBI value suggesting higher water quality. Tolerance values were assigned based on updated published procedures (Lenat 1993) provided by the North Carolina Department of Environmental Quality in 2010 (Appendix E, NCDEQ, 2016). Tolerance values also range from 0.0 to 10.0 and with a lower tolerance value indicating the organism is very intolerant of organic wastes and has a decreased ability to survive under stressful conditions, i.e. low oxygen concentration. Abundance classes were assigned as class 1 (rare), 1-2 individuals collected; class 3 (common), 3-9 individuals collected; and class 10 (abundant), >10 individuals collected. The NCBI was then used to determine bio-classifications for small stream criteria in the Piedmont region and were not seasonally corrected (Table 9).

In addition to identifying macroinvertebrates, biomass was calculated for the EPT taxa (Table 7). Organisms total body length was measured with an Olympus eyepiece micrometer model style 10 mm/100 units XY to quantify biomass. The entire length of the eyepiece micrometer is 10 mm in which 1mm = 10 ocular units. Using the eyepiece micrometer, total body length without appendages was measured to the nearest 1 mm for Ephemeroptera, Plecoptera, and Trichoptera (EPT) taxa. In sample vials containing 10 organisms or less, all organisms were measured, and the average biomass of those organisms will be used to calculate total biomass. In sample vials containing greater than 10 organisms, 10 organisms were selected that represented the average size of the organism in the vial. The average biomass of those organisms was multiplied by the total number of organisms to calculate total biomass. More often, there were not more than 10 organisms per sample vial. However, given if a sample does contain more than 10 organisms, they are generally similar in size, so I feel this method was sufficient. However, it is required to note that variability could come into place by over or underestimating total biomass due to the selection of organisms.

To quantify biomass, total body length in ocular units was measured under magnification values ranging from 8X to 20X depending on the size of the organism. Total body length in ocular units was converted to total body length in millimeters using an Azzota stage micrometer slide with a scale of 100X0.10mm. A stage micrometer slide scale is of a true known length (10 mm) and is used for calibration in optical systems. Known conversions are 1mm=10 ocular units and 1mm= 1000 micrometer. Conversation factors for each magnification are provided in Table 8. Using equation 2, biomass (mg/m^2) will be calculated for each organism based on the measured total body length (mm) and published genus specific length-mass regressions (Benke et al. 1999) that provide fitted *a* and *b* constants to be used to calculate biomass (Appendix 1). Because sweep net collection methods are qualitative, the area of organisms collected was estimated for literature comparison purposes. Area (m^2) was obtained by estimated the amount of disturbed area, 48 square inches, and multiplying by the number of replicates (10) to obtain an area of 0.3 m^2.

Table 6. Total count of macroinvertebrate species collected from 11 sites in the Reedy Creek Watershed from 2016-2020.

ORDER	FAMILY	GENUS	SPECIES	COUNT
BIVALVIA	CORBICULIDAE	CORBICULA	FLUMINEA	15
COLEOPTERA	DYTISCIDAE	ACILIUS	SPP.	1
COLEOPTERA	PTILODACTYLIDAE	ANCHYTARUS	BICOLOR	27
COLEOPTERA	CHRYSOMELIDAE	DONACIA	SPP.	3
COLEOPTERA	ELMIDAE	DUBIRAPHIA	SPP.	90
COLEOPTERA	PSEPHENIDAE	ECTOPRIA	NERVOSA	9
COLEOPTERA	DYTISCIDAE	NEOCLYPEODYTES	SPP.	54
COLEOPTERA	HALIPIDAE	PELTODYTES	SPP.	1
COLEOPTERA	PSEPHENIDAE	PSEPHENUS	HERRICKI	19
COLEOPTERA	HYDROPHILIDAE	TROPISTERNOS	SPP.	42
DIPTERA	SCATHOPHAGIDAE	ACANTHOCNEMA	SPP.	1
DIPTERA	SIMULIIDAE	CNEPHIA	ORNITHOPHILA	46
DIPTERA	CERATOPOGONIDAE	CULICOIDES	CULICOIDES	1
DIPTERA	TIPULIDAE	DICRANOTA	SPP.	3
DIPTERA	EPHYDRIDAE	EPHYDRA	SPP.	26
DIPTERA	EMPIDIDAE	HEMERODROMIA	SPP.	11
DIPTERA	TIPULIDAE	HEXATOMA	SPP.	7
DIPTERA	STRATIOMYIDAE	OXYCERA	OXYCERA	1
DIPTERA	TIPULIDAE	PILARIA	SPP.	74
DIPTERA	SIMULIIDAE	PROSIMULIUM	SPP.	6
DIPTERA	PSYCHODIDAE	PSYCHODA	SPP.	9
DIPTERA	SIMULIIDAE	SIMULIUM	SPP.	13
DIPTERA	TABANIDAE	TABANUS	SPP.	92
DIPTERA	PSYCHODIDAE	TELMATOSCOPUS	TELMATOSCOPUS	1
DIPTERA	TIPULIDAE	TIPULA	SPP.	170
DIPTERA	CHIRONOMIDAE			2671
EPHEMEROPTERA	AMELETIDAE	AMELETUS	LINEATUS	1
EPHEMEROPTERA	BAETIDAE	BAETIS	SPP.	362
EPHEMEROPTERA	BAETIDAE	BAETIS	INTERCALARIS	128
EPHEMEROPTERA	EPHEMERELLIDAE	DANNELLA	SIMPLEX	70
EPHEMEROPTERA	EPHEMERELLIDAE	EPHEMERELLA	DOROTHEA	187
EPHEMEROPTERA	EPHEMERELLIDAE	EURYLOPHELLA	DORIS	2
EPHEMEROPTERA	LEPTOPHLEBIIDAE	HABROPHLEBIA	SPP.	4
EPHEMEROPTERA	HEPTAGENIIDAE	MACCAFFERTIUM	MODESTUM	750
EPHEMEROPTERA	BAETIDAE	PLAUDITUS	CESTUS	12
EPHEMEROPTERA	HEPTAGENIIDAE	STENONEMA	FEMORATUM	5
GASTROPODA	PLANORBIDAE	HELISOMA	ANCEPS	2
GASTROPODA	PHYSIDAE	PHYSA	SPP.	489

HIRUDINEA	ERPOBDELLIDAE	ERPOBDELLA	MOOREOBDELLA	38
MEGALOPTERA	CORYDALIDAE	NIGRONIA	FASCIATUS	4
MEGALOPTERA	SIALIDAE	SIALIS	SPP.	1
ODONATA	COENAGRIONIDAE	ARGIA	SPP.	234
ODONATA	AESHNIDAE	BOYERIA	GRAFIANA	21
ODONATA	CALOPTERYGIDAE	CALOPTERYX	SPP.	60
ODONATA	CORDULEGASTRIDAE	CORDULEGASTER	MACULATA	5
ODONATA	CORDULEGASTRIDAE	CORDULEGASTER	SPP.	75
ODONATA	LIBELLULIDAE	ERYTHEMIS	SIMPLICICOLLIS	5
ODONATA	GOMPHIDAE	GOMPHUS	SPP.	11
ODONATA	GOMPHIDAE	HAGENIUS	BREVISTYLUS	6
ODONATA	CALOPTERYGIDAE	HETAERINA	SPP.	17
ODONATA	LIBELLULIDAE	LIBELLULA	SPP.	3
ODONATA	AESHNIDAE	NASIAESCHNA	PENTACANTHA	34
ODONATA	GOMPHIDAE	OPHIOGOMPHUS	SPP.	8
ODONATA	LIBELLULIDAE	PLATHEMIS	SPP.	10
ODONATA	GOMPHIDAE	PROGOMPHUS	OBSCURUS	130
OLIGOCHAETA	HAPLOTAXIDAE	HAPLOTAXIS	GORDIOIDES	39
PLECOPTERA	CAPNIIDAE	ALLOCAPNIA	SPP.	111
PLECOPTERA	CHLOROPERLIDAE	ALLOPERLA	SPP.	77
PLECOPTERA	NEMOURIDAE	APHINEMURA	SPP.	41
PLECOPTERA	PERLODIDAE	DIPLOPERLA	DUPLICATA	1
PLECOPTERA	PERLIDAE	ECCOPTURA	XANTHENES	43
PLECOPTERA	PERLODIDAE	ISOPERLA	TRANSMARINA	35
PLECOPTERA	PERLIDAE	PERLINELLA	DRYMO	37
PLECOPTERA	PERLIDAE	PERLINELLA	EPHYRE	6
TRICHOPTERA	CALAMOCERATIDAE	ANISOCENTROPUS	PYRALOIDES	2
TRICHOPTERA	HYDROPSYCHIDAE	CHEUMATOPSYCHE	SPP.	1158
TRICHOPTERA	PHILOPOTAMIDAE	CHIMARRA	SPP.	71
TRICHOPTERA	HYDROPSYCHIDAE	DIPLECTRONA	MODESTA	72
TRICHOPTERA	GOERIDAE	GOERA	CALCARATA	1
TRICHOPTERA	HYDROPSYCHIDAE	HYDROPSYCHE	BETTENI	469
TRICHOPTERA	LIMNEPHILIDAE	IRONOQUIA	PUNCTACISSIMA	6
TRICHOPTERA	LEPIDOSTOMATIDAE	LEPIDOSTOMA	SPP.	65
TRICHOPTERA	UENOIDEA	NEOPHYLAX	OLIGIUS	274
TRICHOPTERA	PHRYGANEIDAE	OLIGOSTOMIS	SPP.	5
TRICHOPTERA	ODONTOCERIDE	PSILOTRETA	SPP.	3
TRICHOPTERA	PHRYGANEIDAE	PTILOSTOMIS	SPP.	2
TRICHOPTERA	LIMNEPHILIDAE	PYCNOPSYCHE	SCABRIPENNIS	24
TRICHOPTERA	RHYACOPHILIDAE	RHYACOPHILA	SPP.	4
TOTAL				**8613**

Table 7. Total measured and total count of macroinvertebrate species for biomass analysis. Species are of the EPT taxa collected from 2016-2020 at the Reedy Creek Watershed.

FAMILY	GENUS	SPECIES	MEASURED	COUNT
BAETIDAE	BAETIS	SPP.	77	362
BAETIDAE	BAETIS	INTERCALARIS	99	126
EPHEMERELLIDAE	DANNELLA	SIMPLEX	45	70
EPHEMERELLIDAE	EPHEMERELLA	DOROTHEA	81	186
EPHEMERELLIDAE	EURYLOPHELLA	DORIS	2	2
LEPTOPHLEBIIDAE	HABROPHLEBIA	SPP.	4	4
HEPTAGENIIDAE	MACCAFFERTIUM	MODESTUM	339	748
BAETIDAE	PLAUDITUS	CESTUS	12	12
HEPTAGENIIDAE	STENONEMA	FEMORATUM	5	5
CAPNIIDAE	ALLOCAPNIA	SPP.	42	111
CHLOROPERLIDAE	ALLOPERLA	SPP.	58	76
NEMOURIDAE	APHINEMURA	SPP.	27	43
PERLODIDAE	DIPLOPERLA	DUPLICATA	1	1
PERLIDAE	ECCOPTURA	XANTHENES	35	43
PERLODIDAE	ISOPERLA	TRANSMARINA	15	35
PERLIDAE	PERLINELLA	DRYMO	38	38
PERLIDAE	PERLINELLA	EPHYRE	6	6
CALAMOCERATIDAE	ANISOCENTROPUS	PYRALOIDES	2	2
HYDROPSYCHIDAE	CHEUMATOPSYCHE	SPP.	361	1171
PHILOPOTAMIDAE	CHIMARRA	SPP.	47	69
HYDROPSYCHIDAE	DIPLECTRONA	MODESTA	48	70
GOERIDAE	GOERA	CALCARATA	1	1
HYDROPSYCHIDAE	HYDROPSYCHE	BETTENI	197	475
LIMNEPHILIDAE	IRONOQUIA	PUNCTACISSIMA	5	5
LEPIDOSTOMATIDAE	LEPIDOSTOMA	SPP.	32	61
UENOIDEA	NEOPHYLAX	OLIGIUS	85	167
PHRYGANEIDAE	OLIGOSTOMIS	SPP.	2	2
ODONTOCERIDE	PSILOTRETA	SPP.	3	3
PHRYGANEIDAE	PTILOSTOMIS	SPP.	2	2
LIMNEPHILIDAE	PYCNOPSYCHE	SCABRIPENNIS	21	22
RHYACOPHILIDAE	RHYACOPHILA	SPP.	2	2
			1694	**3920**

Table 8. Total body length conversion factors for each magnification level utilized to quantify EPT biomass. **Note the conversion factor is unique to the microscope.*

Magnification (X)	Conversion Factor
8	0.122 mm = 1 ocular unit
10	0.099 mm = 1 ocular unit
12.5	0.079 mm = 1 ocular unit
16	0.062 mm = 1 ocular unit
20	0.050 mm = 1 ocular unit

5.3: Water Quality

At all 11 surface water sites, the following water quality parameters were measured: pH, dissolved oxygen (DO) (mg/L), temperature (°C), and specific conductivity (SC) (µS/cm). These common parameters govern biological and chemical processes as organisms tolerate a specific range of each parameter to survive, grow, and reproduce. The water quality parameters were measured seasonally pre-restoration and were collected post-restoration using the same methodology. To collect water quality data, the YSI multi-parameter probe was submerged facing into the flow of the stream at base flow conditions. Once the reading stabilized, the value displayed on the field meter was recorded. Recording the water chemistry at the 11 surface water sites will provide the background environmental conditions to help interpret pre-restoration and post-restoration results to interpret seasonal patterns and make hypotheses regarding future research.

SECTION 6: DATA ANALYSIS

Equation 1: North Carolina Biotic Index (NCBI).

$$B=\Sigma(T_i N_i) / N$$

Where:
B= Biotic Index
T_i= Tolerance Value (TV) for the i^{th} taxon
N_i = abundance category value (1, 3, or 10) for the i^{th} taxon
N = sum of all abundance category values

Table 9. NCBI threshold for determining bioclassification using small stream criteria (drainage area ≤ 3.0 square miles) in the piedmont region. (NCDEQ, 2016).

Bioclassification	Piedmont Biotic Index Values	Abbreviation
Excellent	< 4.31	E
Good	4.31 – 5.18	G
Good-Fair	5.19 – 5.85	G-F
Fair	5.86 – 6.91	F
Poor	> 6.91	P

Equation 2: Length-Mass Regression to calculate EPT biomass (Benke *et al.* 1999).

$$M = aL^b$$

Where:
M = organism mass (mg)
L = total body length (mm)
**a* and *b* are fitted constants at the genus level.

For all measured metrics (taxa richness, EPT richness, abundance, EPT percent composition, NCBI, and EPT biomass) a two-sample t-test assuming unequal variance with an alpha level of 0.05 was performed three times. For each metric, the t-test compared before and after restoration at the site level for 1) all restoration data, 2) all summer restoration data, and 3) all winter restoration data.

For the BACI analysis, a two-sample t-test assuming unequal variance with an alpha level of 0.05 was performed. In the sample design, C2 was the control in all the statistical analysis performed to determine significant difference between each metric among the impact sites (D2, D1, C1, A4, A3, A2, A1, R2, and R1). For analysis, all pre-restoration and all post-restoration data were included for each studied metric. Appendix 4 includes an example highlighting the significant difference in abundance after restoration between site C2 and D2.

SECTION 7: RESULTS

7.1: Macroinvertebrate Composition

From 2016-2020 a total of 8613 macroinvertebrates representing 79 unique species were collected at the 11 surface water sites across the Reedy Creek watershed (Table 6). The most common taxa belonged to the Orders Diptera, Trichoptera, and Ephemeroptera. Of the total 3132 Diptera collected, 2671 belonged to the family Chironomidae. Of the total 2156 Trichoptera collected, 1158 were *Cheumatopsyche spp.* Of the total 1521 Ephemeroptera collected, 750 were *Maccaffertium Modestum.*

Across the developed sub-watershed, Trichoptera (*Cheumatopsyche ssp*.; 463), Diptera (Chironomidae; 430), and Gastropoda (*Physa spp*.; 95) were the most abundant. Across the agricultural sub-watershed, Diptera (Chironomidae; 1460), Gastropoda (Physa spp.; 330), Ephemeroptera (*Baetis spp*.; 322, *Maccaffertium modestum*; 120, *Ephemerella dorothea;* 109), and Trichoptera (*Cheumatopsyche spp*.;288, *Hydropsyche betteni*; 174, *Neophylax oligius*; 137) were most abundant. Across the pond influence sub-watershed, Diptera (Chironomidae; 220) and Trichoptera (*Cheumatopsyche ssp*.; 185) were most abundant. Across the Reedy influence sub-watershed, Ephemeroptera (*Maccaffertium modestum*; 462), Diptera (Chironomidae; 409), and Trichoptera (*Cheumatopsyche ssp*.;138) were the most abundant. Across the forested control sub-watershed, abundance was spread more evenly amongst Diptera (Chironomidae; 266), Trichoptera (*Neophylax oligius*; 116, *Hydropsyche Betteni*; 115, *Cheumatopsyche ssp*.; 84, *Diplectrona Modesta;* 57), Coleoptera (*Dubiraphia spp*.; 67), and Ephemeroptera (*Maccaffertium modestum*; 130, *Ephemerella dorothea*; 63).

Table 10. 2016 Summary of macroinvertebrate metrics in Reedy Creek. Seasons are winter (W), spring (SP), summer (SU), and fall (F). **indicates the site was not sampled.*

		A4	A3	A2	A1	C1	C2	D2	D1	P1	R2	R1
SU	Total Organisms	7	65	66	42	52	26	28	3	10	33	32
	Taxa Richness	7	17	17	11	13	12	7	3	7	8	13
	EPT Richness	1	7	6	4	5	5	0	0	1	4	4
	NCBI	6.66	6.25	4.63	7.30	6.64	4.97	7.83	6.17	7.01	5.84	6.60
	Classification	F	F	G	P	F	G	P	F	P	G-F	F
F	Total Organisms	3	10	92	40	*	56	5	5	3	9	14
	Taxa Richness	1	3	16	5	*	12	3	2	3	6	4
	EPT Richness	1	1	7	2	*	8	0	0	0	3	3
	NCBI	3.30	5.84	5.71	4.24	*	4.66	5.96	7.38	6.87	5.65	5.64
	Classification	E	G-F	G-F	E	*	G	F	P	F	G-F	G-F

Table 11. 2017 Summary of macroinvertebrate metrics in Reedy Creek. Seasons are winter (W), spring (SP), summer (SU), and fall (F). **indicates the site was not sampled.*

		A4	A3	A2	A1	C1	C2	D2	D1	P1	R2	R1
SP	Total Organisms	60	55	94	606	56	80	18	0	13	23	27
	Taxa Richness	13	14	17	23	7	19	6	0	7	7	8
	EPT Richness	8	8	7	8	5	10	3	0	1	4	6
	NCBI	4.19	4.46	5.33	5.14	4.45	4.23	3.84	NA	6.63	5.79	4.55
	Bioclassification	E	G	G-F	G	G	E	E	NA	F	G-F	G
SU	Total Organisms	28	34	4	12	*	91	28	13	39	14	10
	Taxa Richness	3	10	3	7	*	14	9	6	10	5	7
	EPT Richness	2	5	0	1	*	5	4	4	5	1	3
	NCBI	3.37	4.28	7.67	5.85	*	3.81	6.31	6.35	6.12	6.83	6.49
	Bioclassification	E	E	P	G-F	*	E	F	F	F	F	F
F	Total Organisms	13	26	53	60	*	62	39	23	4	84	35
	Taxa Richness	3	8	7	12	*	11	9	6	2	11	7
	EPT Richness	2	1	1	3	*	4	2	2	0	4	1
	NCBI	2.74	5.94	7.84	7.05	*	6.14	6.01	7.03	7.58	6.45	7.07
	Bioclassification	E	F	P	P	*	F	F	P	P	F	P

Table 12. 2018 Summary of macroinvertebrate metrics in Reedy Creek. Seasons are winter (W), spring (SP), summer (SU), and fall (F). **indicates the site was not sampled.*

		A4	**A3**	**A2**	**A1**	**C1**	**C2**	**D2**	**D1**	**P1**	**R2**	**R1**
W	Total Organisms	14	45	*	13	*	51	*	*	19	34	10
	Taxa Richness	3	13	*	7	*	16	*	*	9	10	4
	EPT Richness	2	6	*	4	*	8	*	*	4	5	1
	NCBI	3.80	4.27	*	6.77	*	4.44	*	*	5.55	6	6.52
	Bioclassification	E	E	*	F	*	G	*	*	G-F	F	F
SU	Total Organisms	48	166	175	*	10	47	*	125	*	20	7
	Taxa Richness	10	5	8	*	6	17	*	10	*	9	4
	EPT Richness	1	1	0	*	2	7	*	3	*	3	2
	NCBI	7.68	6.56	7.54	*	5.35	4.61	*	7.19	*	6.52	6.35
	Bioclassification	P	F	P	*	G-F	G	*	P	*	F	F
F	Total Organisms	42	21	14	44	100	58	188	188	33	*	*
	Taxa Richness	7	3	6	7	13	17	8	8	3	*	*
	EPT Richness	4	2	2	4	7	8	2	2	1	*	*
	NCBI	6.29	8.46	5.13	6.17	5.8	3.55	7.53	7.53	6.95	*	*
	Bioclassification	F	P	G	F	G-F	E	P	P	P	*	*

Table 13. 2019 Summary of macroinvertebrate metrics in Reedy Creek. Seasons are winter (W), spring (SP), summer (SU), and fall (F). **indicates the site was not sampled.*

		A4	**A3**	**A2**	**A1**	**C1**	**C2**	**D2**	**D1**	**P1**	**R2**	**R1**
W	Total Organisms	89	48	144	66	60	68	84	96	27	41	16
	Taxa Richness	7	6	7	6	11	11	5	7	5	3	4
	EPT Richness	3	3	2	3	7	7	1	2	1	0	2
	NCBI	6.19	7.33	7.19	7.20	4.82	3.40	5.84	6.86	7.58	6.89	6.46
	Bioclassification	F	P	P	P	G	E	G-F	F	P	F	F
SU	Total Organisms	67	311	87	174	126	27	49	54	135	146	81
	Taxa Richness	10	9	8	12	11	8	9	7	9	6	10
	EPT Richness	4	3	3	6	7	6	2	2	3	4	4
	NCBI	7.34	6.83	7.4	6.88	6.50	4.83	7.07	7.53	7.15	6.76	6.42
	Bioclassification	P	F	P	F	F	G	P	P	P	F	F
F	Total Organisms	31	20	78	70	66	17	36	22	7	87	166
	Taxa Richness	2	6	11	9	10	6	8	9	3	11	6
	EPT Richness	0	0	5	4	3	2	4	4	0	6	4
	NCBI	7.30	8.26	6.91	6.19	7.11	5.65	7.46	5.61	6.58	6.33	5.15
	Bioclassification	P	P	P	F	P	G-F	P	G-F	F	F	G

Table 14. Summary of macroinvertebrate metrics in Reedy Creek. Seasons are winter (W), spring (SP), summer (SU), and fall (F). **indicates the site was not sampled.*

		A4	**A3**	**A2**	**A1**	**C1**	**C2**	**D2**	**D1**	**P1**	**R2**	**R1**
W	Total Organisms	70	77	108	84	67	85	100	62	81	181	268
	Taxa Richness	8	6	10	9	15	13	10	8	8	11	13
	EPT Richness	1	1	4	4	8	5	1	3	1	4	6
	NCBI	7.76	6.74	7.05	6.27	5.24	5.73	7.58	7.30	7.39	6.19	5.88
	Bioclassification	P	F	P	F	G-F	G-F	P	P	P	F	F
SU	Total Organisms	123	171	100	103	149	80	83	63	78	45	73
	Taxa Richness	5	9	7	10	14	20	10	13	10	6	6
	EPT Richness	1	3	3	4	4	7	4	4	3	2	3
	NCBI	7.48	7.39	7.39	6	5.38	4.49	7.58	7.05	7.40	6.37	6.18
	Bioclassification	P	P	P	F	G-F	G	P	P	P	F	F

Table 15. *p*-values from BACI analysis for each site with the control as C2 for each site comparison for taxa richness, abundance, and NCBI values. **Indicates significant differences.*

Site	Taxa Richness	EPT Richness	Abundance	NCBI
D2	0.334	0.560	***0.013****	***0.050****
D1	0.081	0.719	***0.010****	0.431
P1	0.559	0.752	0.160	0.258
A4	0.260	1.000	***0.0009****	***0.001****
A3	0.229	0.158	0.108	***0.002****
A2	0.392	0.523	0.154	0.078
A1	0.882	0.323	0.732	0.485
R2	0.549	0.662	0.099	0.573
R1	0.302	0.244	0.083	0.818

Table 16. *p*-values from BACI analysis for each site with the control as C2 for each site comparison for total biomass and EPT biomass. **Indicates significant differences.*

Site	Total Biomass	Ephemeroptera Biomass	Plecoptera Biomass	Trichoptera Biomass
D2	0.499	0.224	0.517	0.241
D1	0.709	0.279	0.448	0.387
P1	0.870	0.247	0.517	0.420
A4	0.618	0.344	0.651	0.874
A3	0.927	0.178	0.639	0.583
A2	0.509	0.250	0.800	0.822
A1	0.643	0.282	0.755	0.520
R2	0.097	0.202	0.523	0.458
R1	0.265	0.351	0.594	0.998

7.1.1: Taxa Richness

Across the development sub-watershed, taxa richness ranged from 2 (D1) to 9 (D2) pre-restoration and ranged from 5 (D2) to 13 (D1) post-restoration (Figure 5). For site D2, the average taxa richness increased from 7 pre-restoration to 8 post-restoration. For site D1, the average taxa richness increased from 4 pre-restoration to 9 post-restoration (Figure 5). For site D1, there was a significant difference between taxa richness among all pre-restoration and all post-restoration data collected (Table 17; t-test, p=0.009, α=0.05). After restoration, taxa richness at site D2 significantly increased (Figure 10).

Across the forested control sub-watershed, taxa richness ranged from 7 (C1) to 19 (C2) pre-restoration and ranged from 6 (C1/C2) to 20 (C2) post-restoration (Figure 6). Taxa richness fluctuated pre-restoration and post-restoration at C1 and C2 and therefore there was no significant difference at either site (Table 18).

Across the pond influence sub-watershed, taxa richness ranged from 2 to 10 pre-restoration and 3 to 10 post-restoration (P1) (Figure 7). For site P1, the average taxa richness was 6 pre-restoration and 6 post-restoration. There was no significant difference in taxa richness at P1 before and after restoration (Table 17).

Across the agricultural sub-watershed, taxa richness ranged from 1 (A4) to 17 (A3) pre-restoration and ranged from 2 (A4) to 12 (A1) post-restoration (Figure 8). For site A4, the average taxa richness increased from 5 pre-restoration to 7 post-restoration. For site A3, the average taxa richness decreased from 11 pre-restoration to 6 post-restoration. For site A2, the average taxa richness decreased from 12 pre-restoration to 8 post-restoration. For site A2, there was a significant difference in taxa richness between winter pre-restoration and winter post-restoration (Table 17; t-test, p=0.003, α=0.05). After restoration, taxa richness at site A2 significantly decreased (Figure 11). For site A1, the average taxa richness decreased from 11 pre-restoration to 9 post-restoration.

Across the Reedy influence (mainstem) sub-watershed, taxa richness ranged from 4 (R1) to 13 (R1) pre-restoration and 3 (R2) to 13 (R1) post-restoration (Figure 9). For site R2, the average taxa richness decreased from 8 pre-restoration to 7 post-restoration. For site R1, the average taxa richness increased from 7 pre-restoration to 8 post-restoration.

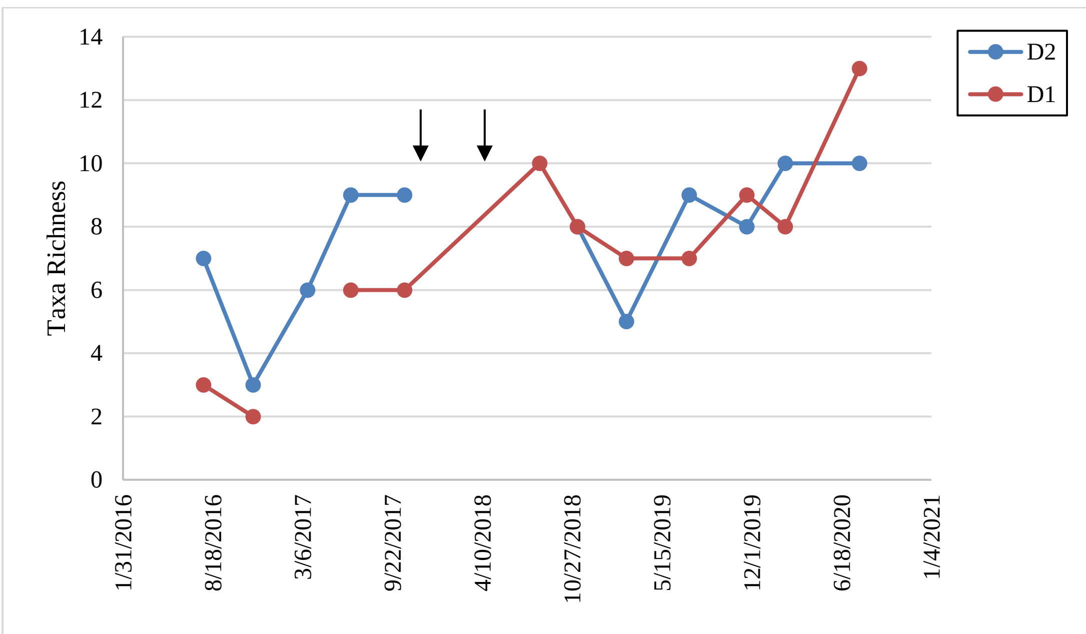

Figure 5. Taxa richness for the development influence sub-watershed from 2016-2020. Black arrows represent the start and end date of restoration construction, respectively.

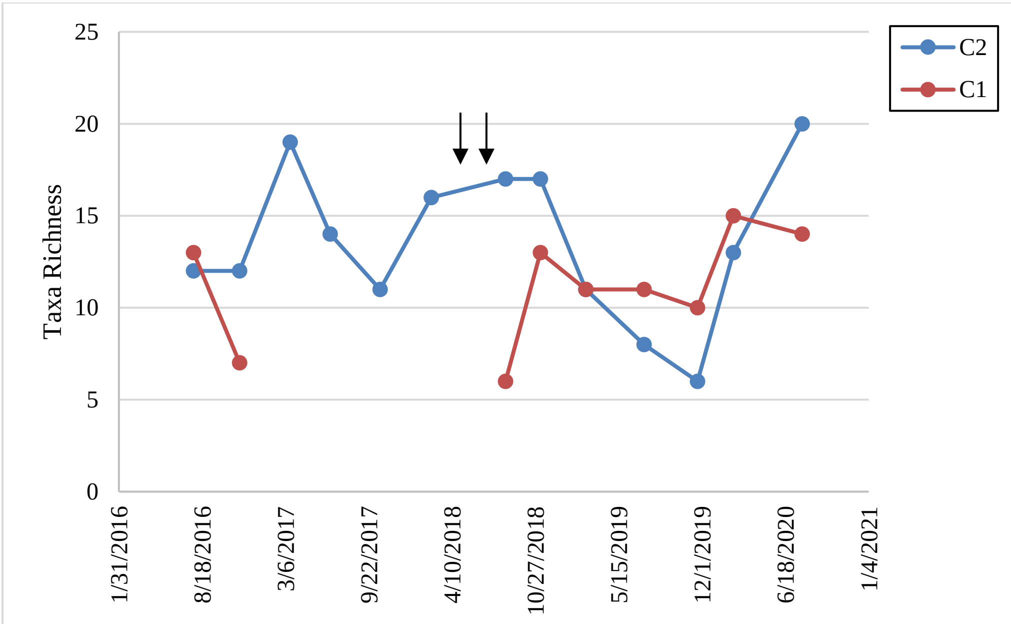

Figure 6. Taxa richness for the control sub-watershed from 2016-2020. Black arrows represent the start and end date of restoration construction respectively for C1. **Note: C2 was not restored.*

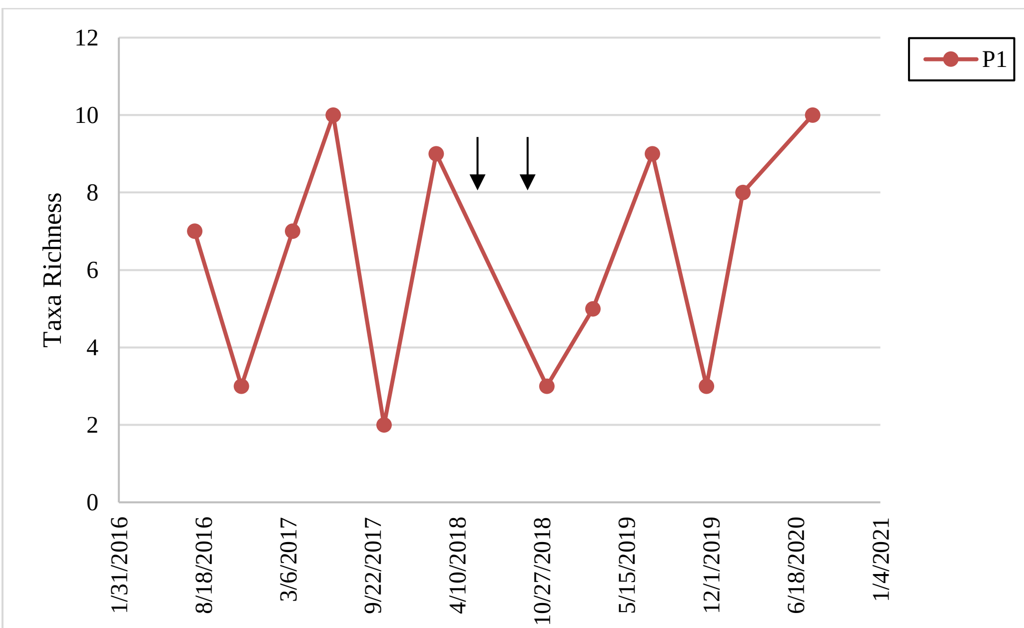

Figure 7. Taxa richness for the pond influence sub-watershed from 2016-2020. Black arrows represent the start and end date of restoration construction, respectively.

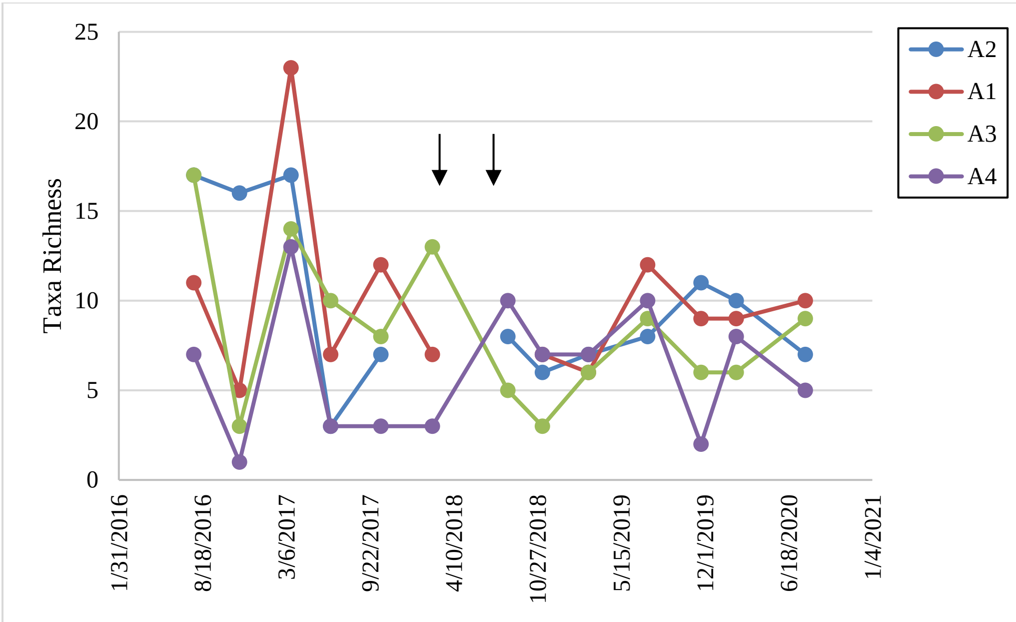

Figure 8. Taxa richness for the agricultural influence sub-watershed from 2016-2020. Black arrows represent the start and end date of restoration construction, respectively.

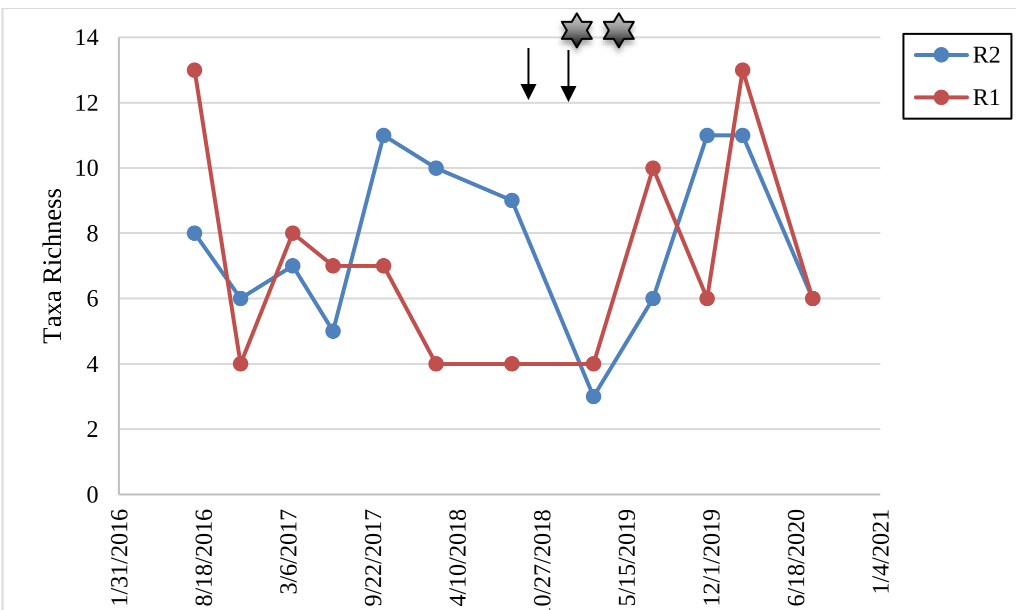

Figure 9. Taxa richness for the Reedy influence (mainstem) sub-watershed from 2016-2020. Black arrows represent the start and end date of restoration construction respectively for site R2. Black stars represent the start and end data of restoration construction respectively for site R1.

Table 17. *p*-values obtained from running a two-sample t-test assuming unequal variances on the difference between the average taxa richness pre-restoration and post-restoration for 9 surface water sites. **Indicates significant differences.*

SEASON	SITE								
	D2	**D1**	**P1**	**A4**	**A3**	**A2**	**A1**	**R2**	**R1**
ALL	0.293	***0.009****	1.000	0.365	0.075	0.269	0.502	0.746	0.609
WINTER	0.216	0.097	0.497	0.938	0.304	***0.003****	0.566	0.834	0.498
SUMMER	0.256	0.088	0.316	0.134	0.279	0.779	0.622	0.169	0.933

Table 18. *p*-values obtained from running a two-sample t-test assuming unequal variances on the difference between the average taxa richness post-restoration between sites C2 and C1. **Indicates significant differences.*

SEASON	C2/C1 POST
ALL	0.464
WINTER	0.854
SUMMER	0.357

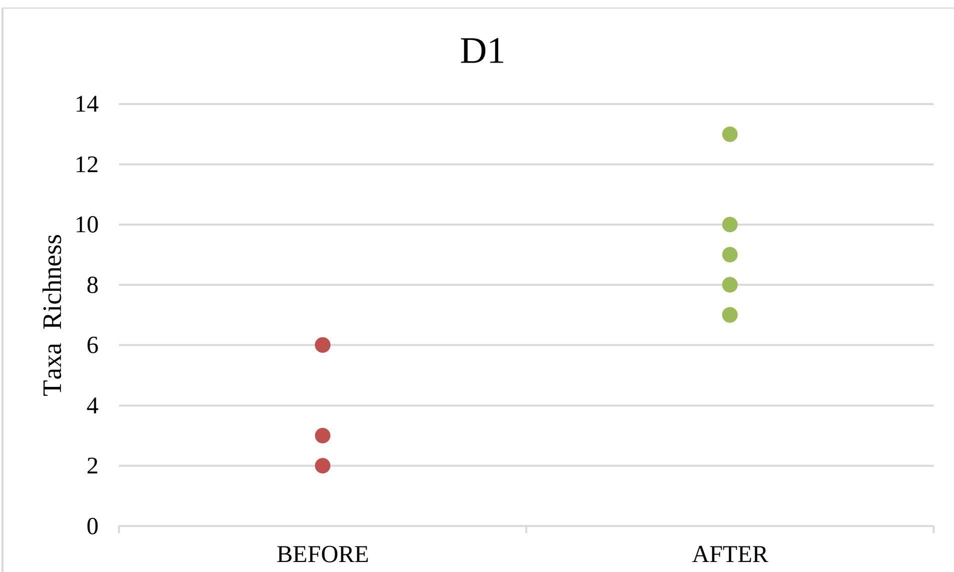

Figure 10. Dot plot showing significant difference in the average taxa richness at site D1 for all before and after restoration data (p=0.009, α=0.05).

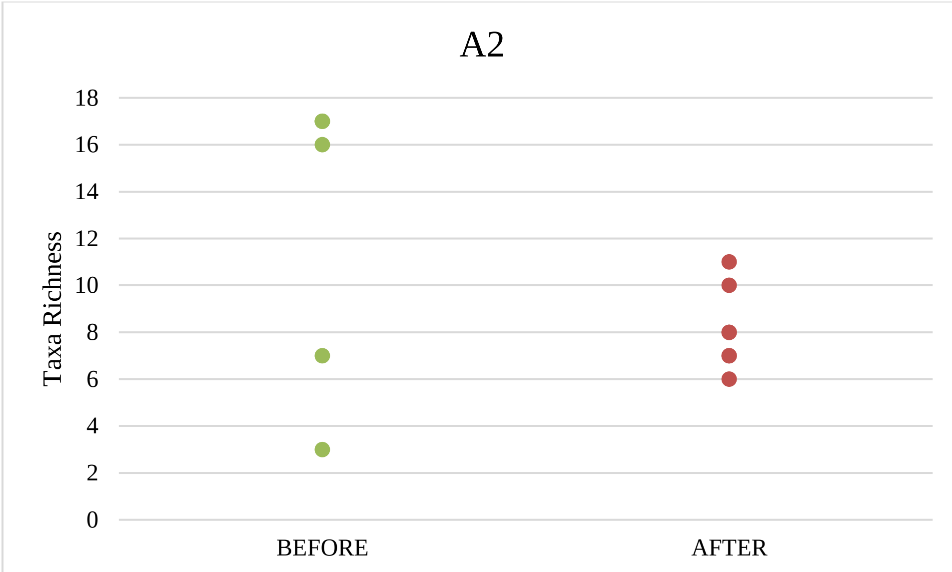

Figure 11. Dot plot showing significant differences in the average taxa richness at site A2 in the winter before and after restoration (*p*=0.003, α=0.05).

7.1.2: EPT Richness

Across the development sub-watershed, EPT richness ranged from 0 (D1/D2) to 4 (D1/D2) pre-restoration and ranged from 1 (D1/D2) to 4 (D1/D2) post-restoration (Figure 12). For D2, the average EPT richness stayed the same being 2 pre-restoration and 2 post-restoration. For D1, the average EPT richness increased from 2 pre-restoration to 3 post-restoration.

Across the forested control sub-watershed, EPT richness ranged from 4 (Site C2) to 10 (Site C2) pre-restoration and ranged from 2 (Site C1/Site C2) to 8 (Site C2) post-restoration (Figure 13). Overall, sites C1 and C2 average EPT richness decreased and there was no significant difference after restoration (Table 20).

Across the pond influence sub-watershed, EPT richness ranged from 0 to 5 pre-restoration and 0 to 3 post-restoration (P1) (Figure 14). For P1, the average EPT richness stayed the same being 2 pre-restoration and 2 post-restoration and there was no significant difference (Table 19).

Across the agricultural sub-watershed, EPT richness ranged from 0 (A2) to 8 (A1/A3/A4) pre-restoration and ranged from 0 (A2) to 6 (A1) post-restoration (Figure 15). For site A4, the average EPT richness decreased from 3 pre-restoration to 2 post-restoration. For site A3, the average EPT richness decreased from 5 pre-restoration to 2 post-restoration. For site A2, the average EPT richness decreased from 4 pre-restoration to 3 post-restoration. For site A2, there was a significant difference in taxa richness between winter pre-restoration and winter post-restoration (Table 19, t-test, p=0.015, α=0.05). After restoration, EPT richness at site A2 significantly decreased (Figure 17). For site A1, the average EPT richness stayed the same at 4 pre-restoration to 4 post-restoration. Overall, the agricultural sub-watershed EPT richness decreased after restoration (Figure 15).

Across the Reedy influence (mainstem) sub-watershed, EPT richness ranged from 1 (R1/R2) to 6 (R1) pre-restoration and 0 (R2) to 6 (R1/R2) post-restoration (Figure 16). For site R2, the average EPT richness stayed the same at 3 pre-restoration to 3 post-restoration. For site R1, the average EPT richness increased from 3 pre-restoration to 4 post-restoration. Across the Reedy influence sub-watershed, there was no significant difference in EPT richness before and after restoration (Table 19).

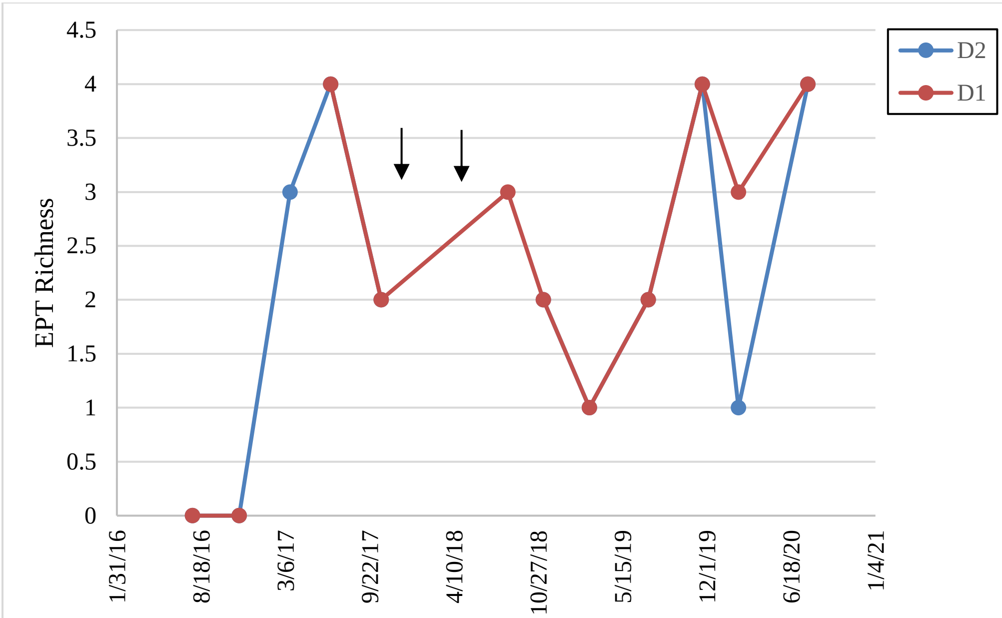

Figure 12. EPT richness for the development influence sub-watershed from 2016-2020. Black arrows represent the start and end date of restoration construction, respectively.

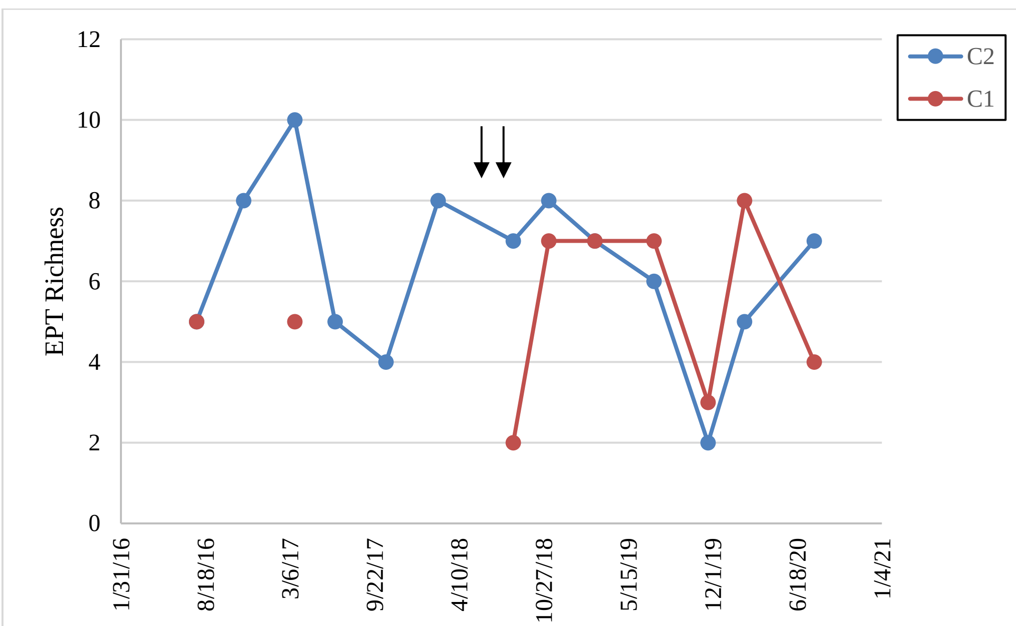

Figure 13. EPT richness for the control sub-watershed from 2016-2020. Black arrows represent the start and end date of restoration construction respectively for C1. *Note* C2 was not restored.*

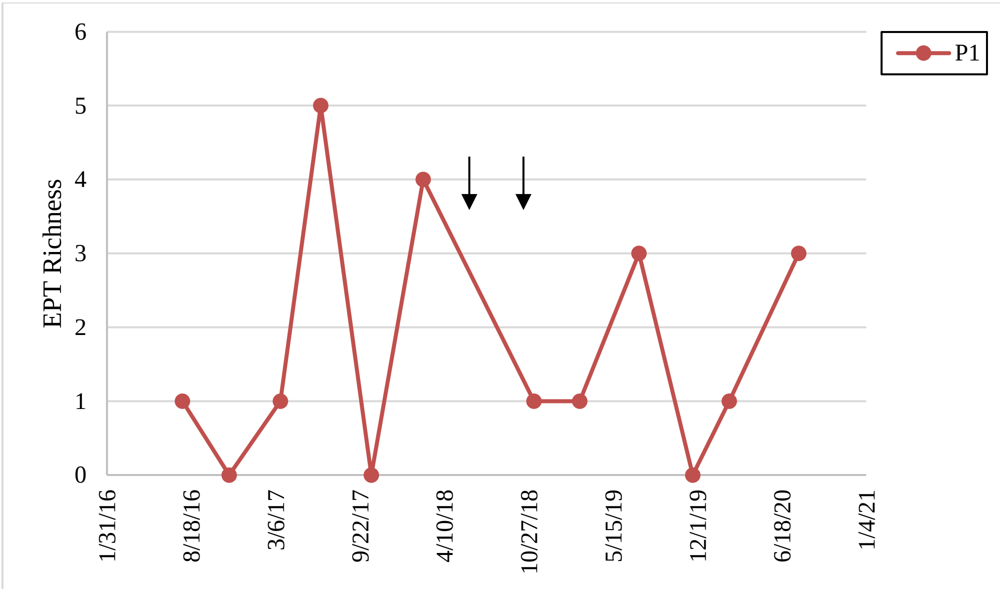

Figure 14. EPT richness for the pond influence sub-watershed from 2016-2020. Black arrows represent the start and end date of restoration construction, respectively.

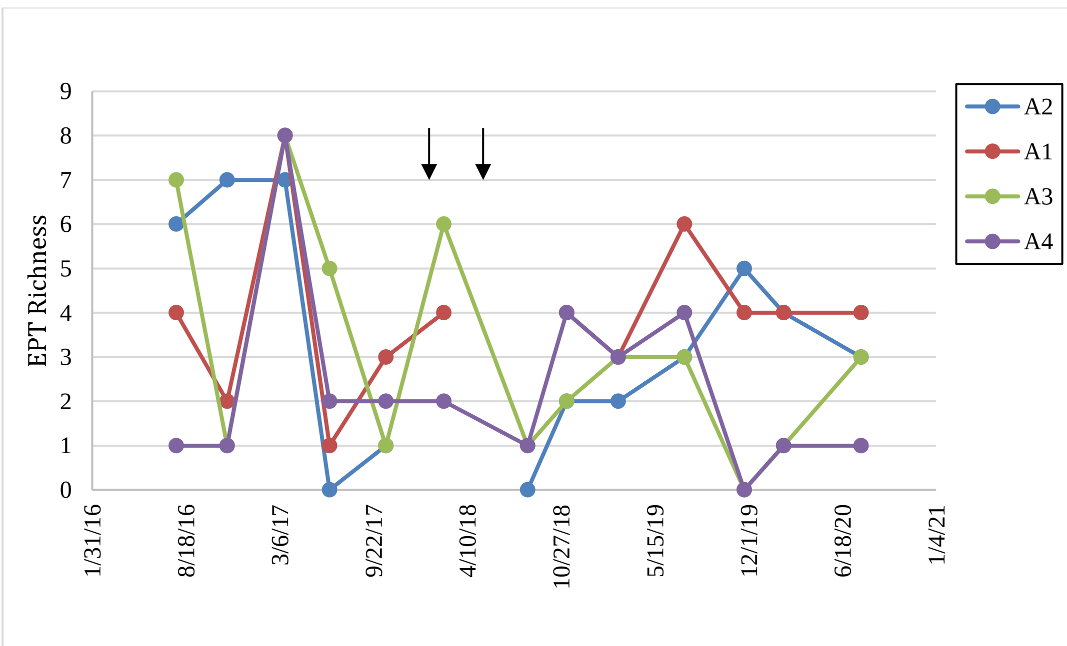

Figure 15. EPT richness for the agricultural influence sub-watershed from 2016-2020. Black arrows represent the start and end date of restoration construction, respectively.

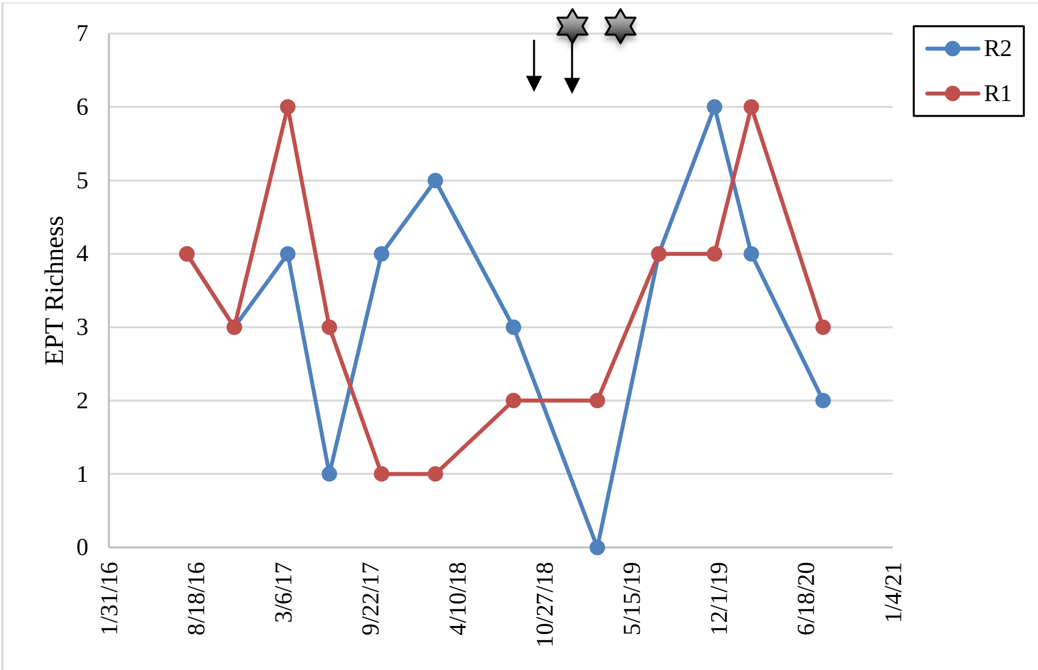

Figure 16. EPT richness for the Reedy influence (mainstem) sub-watershed from 2016-2020. Black arrows represent the start and end date of restoration construction respectively for site R2. Black stars represent the start and end data of restoration construction respectively for site R1.

Table 19. *p*-values obtained from running a two-sample t-test assuming unequal variances (α=0.05) on the difference between the average EPT richness pre-restoration and post-restoration for all 11 surface water sites. Blanks indicate there were not enough replicates to perform a t-test. **Indicates significant differences.*

SEASON	**SITE**								
	D2	**D1**	**P1**	**A4**	**A3**	**A2**	**A1**	**R2**	**R1**
ALL	0.601	0.310	0.749	0.608	0.076	0.408	0.654	0.846	0.341
WINTER	0.814		0.533	0.532	0.249	***0.015****	0.658	0.753	0.738
SUMMER	0.698	0.495	0.579	0.782	0.367	0.884	0.222	1.000	0.288

Table 20. *p*-values obtained from running a two-sample t-test assuming unequal variances (α=0.05) on the difference between the average taxa richness post-restoration between sites C2 and C1. **Indicates significant differences.*

SEASON	**C2/C1 POST**
ALL	0.634
WINTER	0.679
SUMMER	0.258

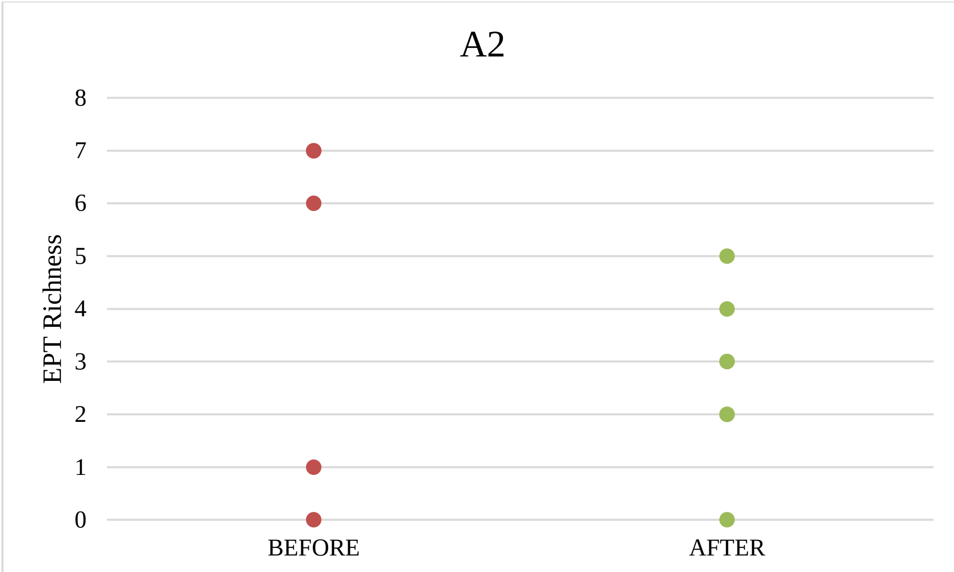

Figure 17. Dot plot showing significant difference in the average taxa richness at site A2 in the winter before and after restoration (p=0.015, α=0.05).

7.1.3: Abundance

Across the development sub-watershed, abundance ranged from 3 (D1) to 31 (D2) pre-restoration and ranged from 22 (D1) to 188 (D1/D2) post-restoration (Figure 18). For site D2, there was a significant difference in abundance between pre-restoration and post-restoration (Table 21, t-test, p=0.026, α=0.05). After restoration, abundance at site D2 significantly increased (Figure 23). For site D1, there was a significant difference in abundance between pre-restoration and post-restoration (Table 21, t-test, p=0.011, α=0.05). After restoration, abundance at site D1 significantly increased (Figure 24).

Across the forested control sub-watershed, abundance ranged from 26 (Site C2) to 91 (Site C2) pre-restoration and ranged from 17 (Site C2) to 149 (Site C1) post-restoration (Figure 19). Overall, C1 had an increase in abundance after restoration while the abundance at C2 decreased initially but has begun to increase again since January

2020. There was no significant difference in abundance between C2 to C2 after restoration (Table 22).

Across the pond influence sub-watershed, abundance ranged from 3 to 19 pre-restoration and 7 to 271 post-restoration (P1) (Figure 20). For P1, the average EPT richness increased from 18 pre-restoration and 175 post-restoration.

Across the agricultural sub-watershed, abundance ranged from 3 (A4) to 606 (A1) pre-restoration and ranged from 20 (A3) to 311 (A3) post-restoration (Figure 21). For site A4, there was a significant difference in abundance between pre-restoration and post-restoration (Table 21, t-test, p=0.010, α=0.05). After restoration, abundance at site A4 significantly increased (Figure 25). For site A3, the average abundance increased from 39 pre-restoration to 116 post-restoration. For site A2, the average abundance increased from 61 pre-restoration to 101 post-restoration. For site A1, the average abundance decreased from 129 pre-restoration to 89 post-restoration. Overall, for the agricultural sub-watershed abundance increased after restoration.

Across the Reedy influence (mainstem) sub-watershed, abundance ranged from 7 (R1) to 84 (R2) pre-restoration and 7 (Site R1) to 268 (Site R1) post-restoration (Figure 22). For site R2, the average abundance increased from 31 pre-restoration to 100 post-restoration. For site R1, the average abundance increased from 19 pre-restoration to 121 post-restoration and there was a significant difference between abundance in the summer pre-restoration and in the summer post-restoration (Table 21, t-test, p=0.003, α=0.05). After restoration, abundance at site R1 significantly increased (Figure 26).

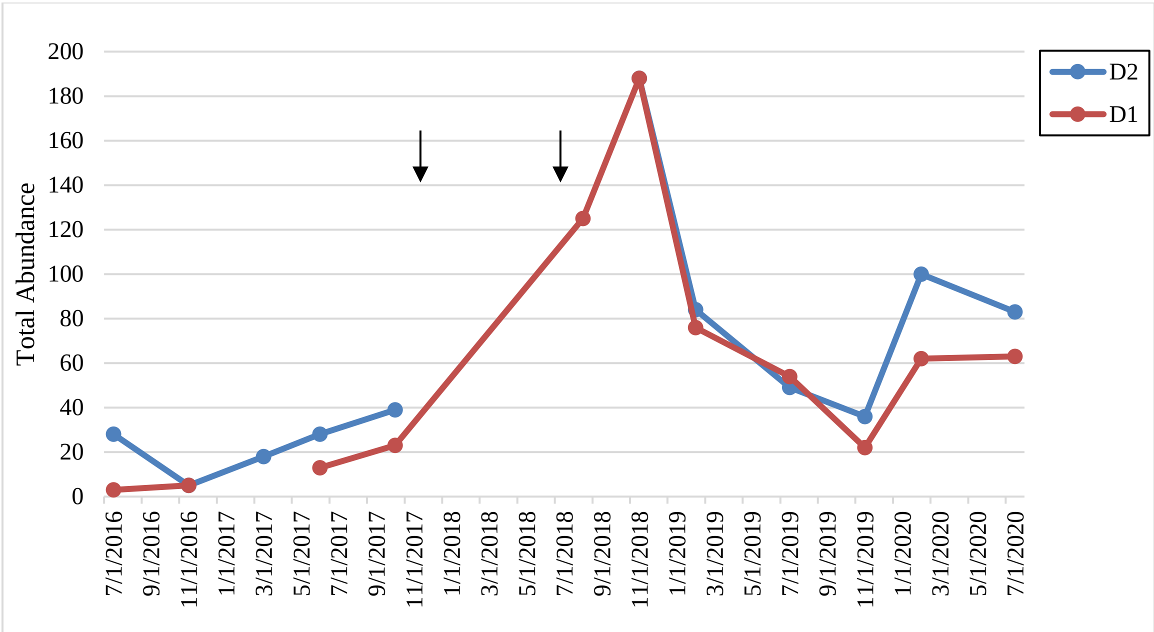

Figure 18. Abundance for the development influence sub-watershed from 2016-2020. Black arrows represent the start and end date of restoration construction, respectively.

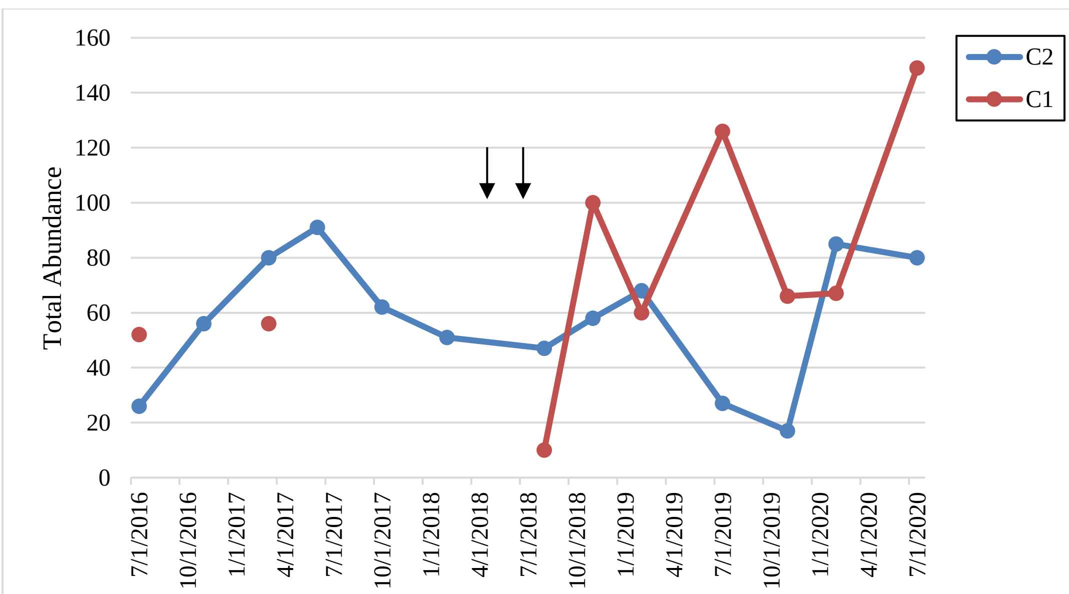

Figure 19. Abundance for the control sub-watershed from 2016-2020. Black arrows represent the start and end date of restoration construction respectively for C1. *Note* C2 was not restored.*

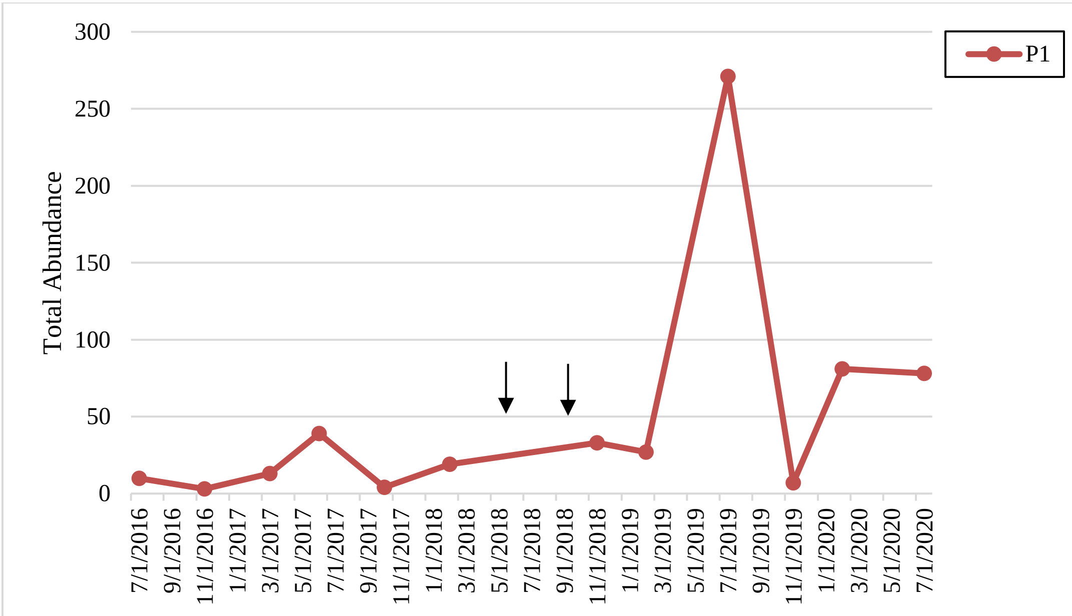

Figure 20. Abundance for the pond influence sub-watershed from 2016-2020. Black arrows represent the start and end date of restoration construction, respectively.

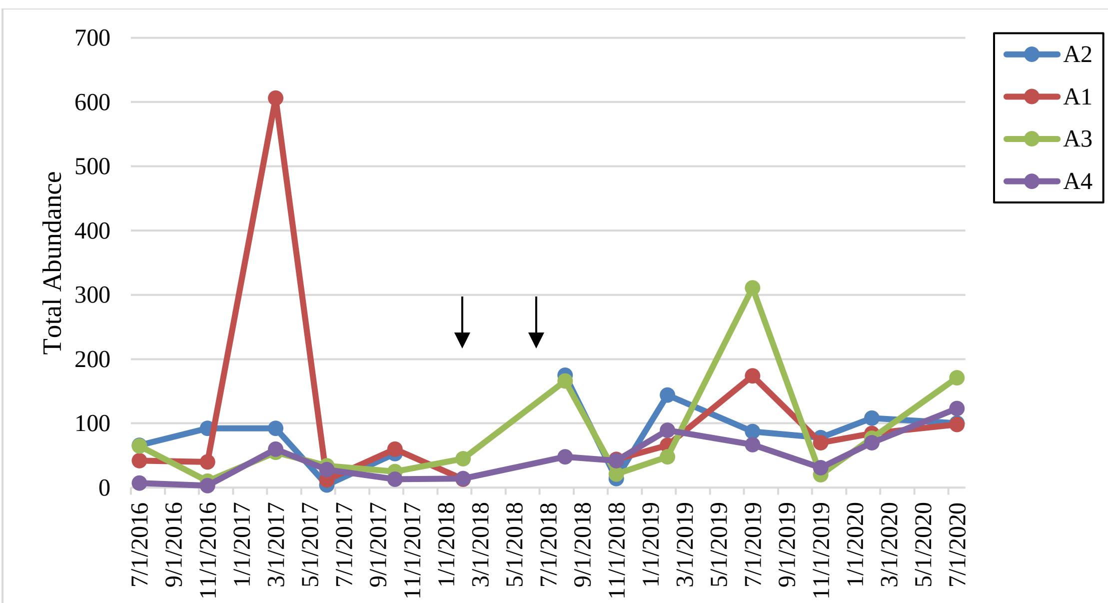

Figure 21. Abundance for the agricultural influence sub-watershed from 2016-2020. Black arrows represent the start and end date of restoration construction, respectively.

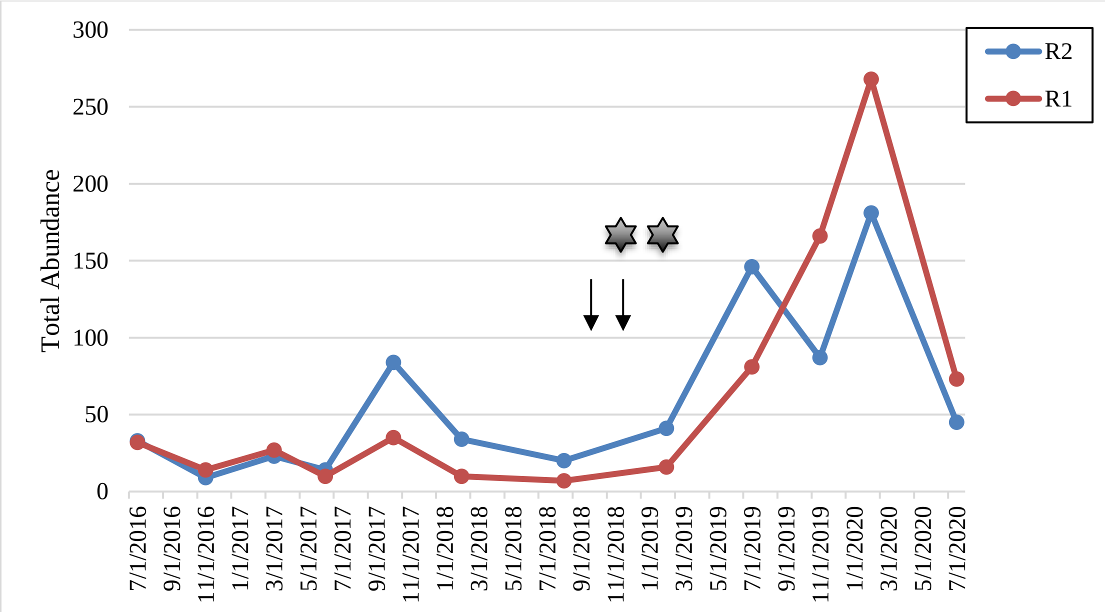

Figure 22. Abundance for the Reedy influence (mainstem) sub-watershed from 2016-2020. Black arrows represent the start and end date of restoration construction respectively for site R2. Black stars represent the start and end data of restoration construction respectively for site R1.

Table 21. *p*-values obtained from running a two-sample t-test assuming unequal variances on the difference between the average total abundance pre-restoration and post-restoration for all 11 surface water sites. Blanks indicate there were not enough replicates to perform a t-test. **Indicates significant differences.*

SEASON	SITE								
	D2	**D1**	**P1**	**A4**	**A3**	**A2**	**A1**	**R2**	**R1**
ALL	***0.026****	***0.011****	0.148	***0.010****	0.109	0.149	0.702	0.065	0.082
WINTER	0.068		0.197	0.214	0.811	0.841	0.510	0.192	0.212
SUMMER	0.298	0.099	0.353	0.113	0.071	0.075	0.249	0.472	***0.003****

Table 22. *p*-values obtained from running a two-sample t-test assuming unequal variances on the difference between the average taxa richness post-restoration between sites C2 and C1. Blanks indicate there were not enough replicates to perform a t-test. **Indicates significant differences.*

SEASON	C2/C1 POST
ALL	0.196
WINTER	0.384
SUMMER	0.409

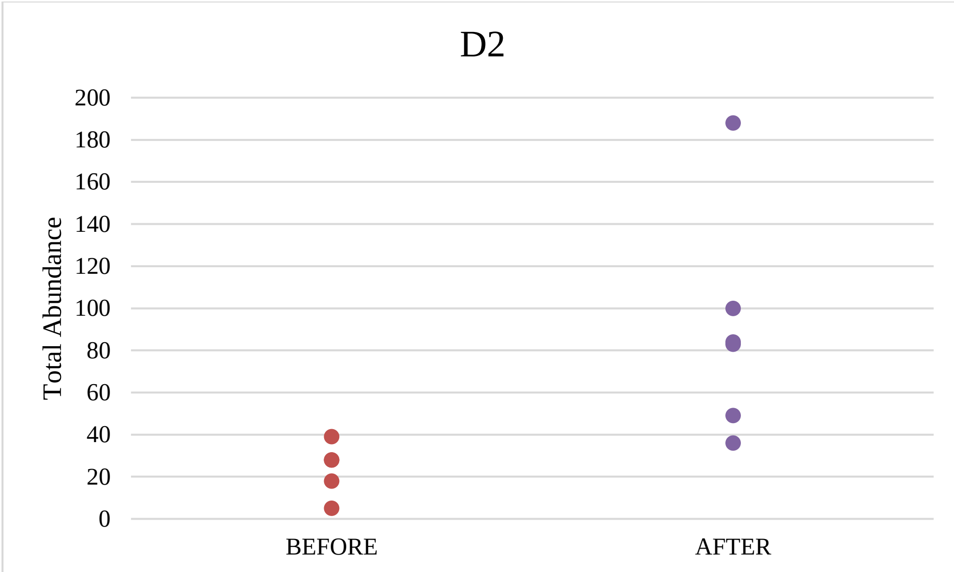

Figure 23. Dot plot showing significant difference in the average total abundance at site D2 before and after restoration (*p*=0.026, α=0.05).

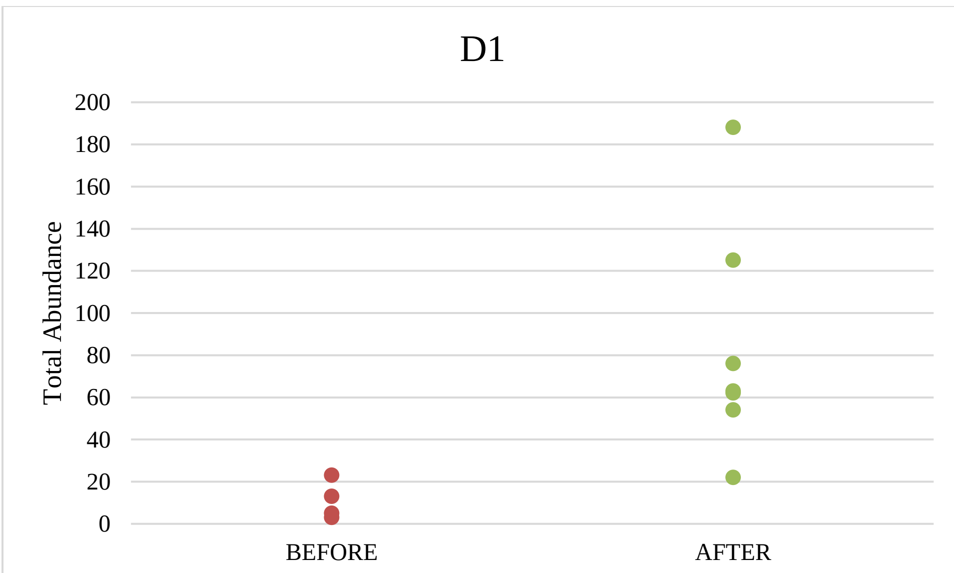

Figure 24. Dot plot showing significant difference in the average total abundance at site D1 before and after restoration (*p*=0.011, α=0.05).

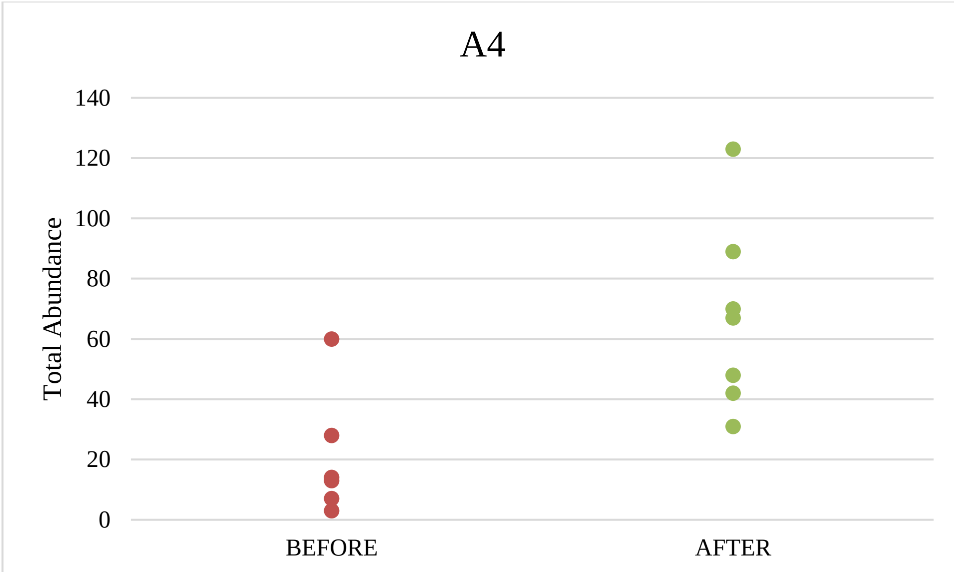

Figure 25. Dot plot showing significant difference in the average total abundance at site A4 before and after restoration (*p*=0.010, α=0.05).

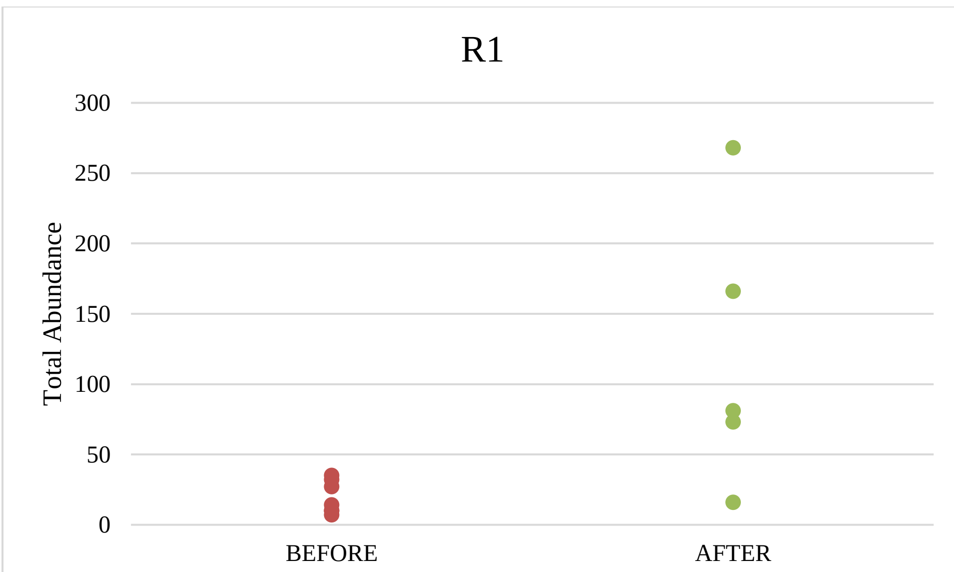

Figure 26. Dot plot showing significant difference in the average total abundance at site R1 in the summer before and after restoration (*p*=0.003, α=0.05).

7.1.4: EPT Percent Composition

For D2, during summer the percentage of Ephemeroptera present decreased from 6% pre-restoration to 2% post-restoration, there was no Plecoptera taxa present before or after restoration, and the percentage of Trichoptera taxa present increased from 18% pre-restoration to 30% post-restoration (Figure 27A, Figure 27B). In winter, the percentage of Ephemeroptera present decreased from 9% pre-restoration to 2% post-restoration, there was no Plecoptera taxa present before or after restoration, and the percentage of Trichoptera taxa present increased from 48% pre-restoration to 54% post-restoration (Figure 27 C, Figure 27 D).

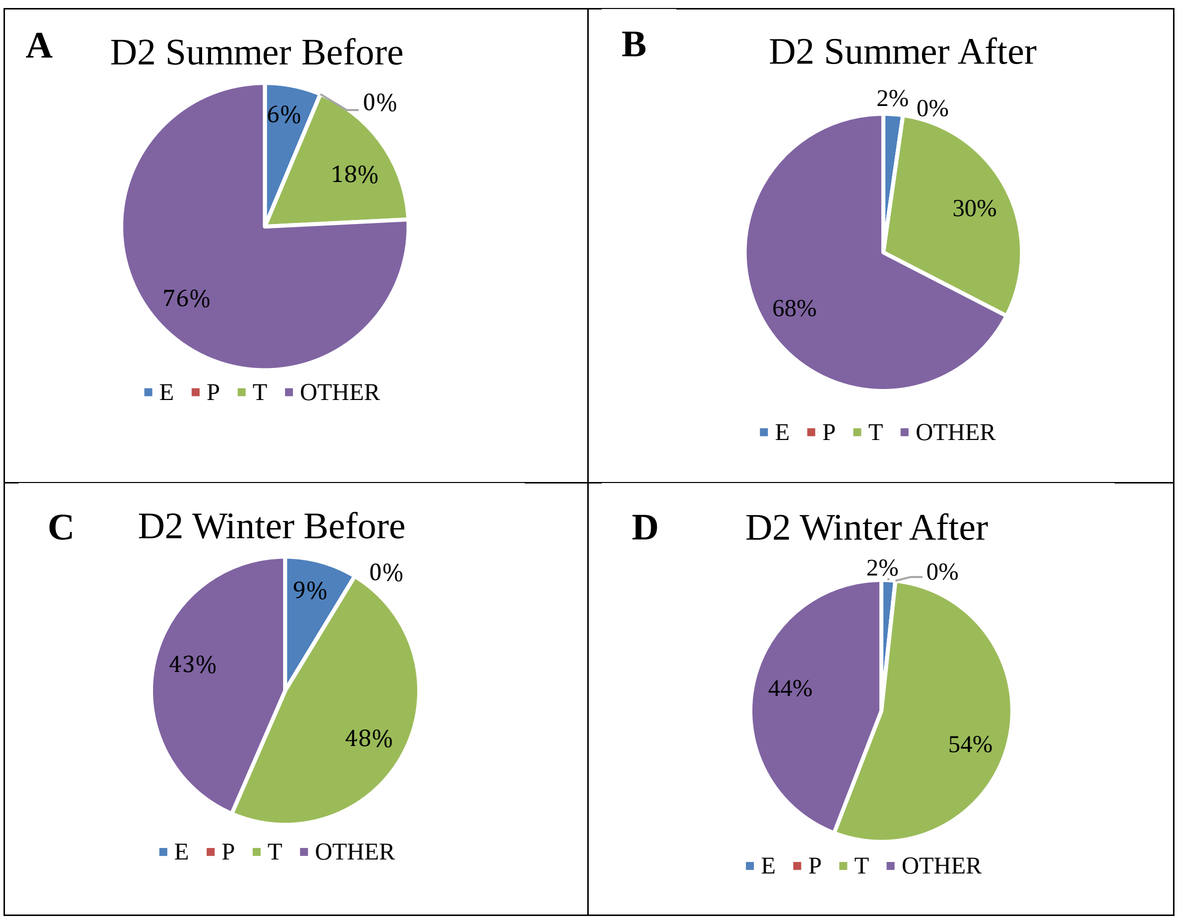

Figure 27. Percent composition for the Ephemeroptera (E), Plecoptera (P), Trichoptera (T), and other taxa based on total abundance for site D2 A) summer pre-restoration, B) summer post-restoration, C) winter pre-restoration, and D) winter post-restoration.

For D1, in summer the percentage of Ephemeroptera stayed the same at 7% before and after restoration, the percentage of Plecoptera present decreased from 1% pre-restoration to 0% post-restoration, and the percentage of Trichoptera taxa present increased from 17% pre-restoration to 35% post-restoration (Figure 28A, Figure 28B). In winter, the percentage of Ephemeroptera present increased from 0% pre-restoration to 3% post-restoration, the percentage of Plecoptera taxa present increased from 0% pre-restoration to 1% post-restoration, the percentage of Trichoptera taxa present increased from 0% pre-restoration to 59% post-restoration (Figure 28C, Figure 28D).

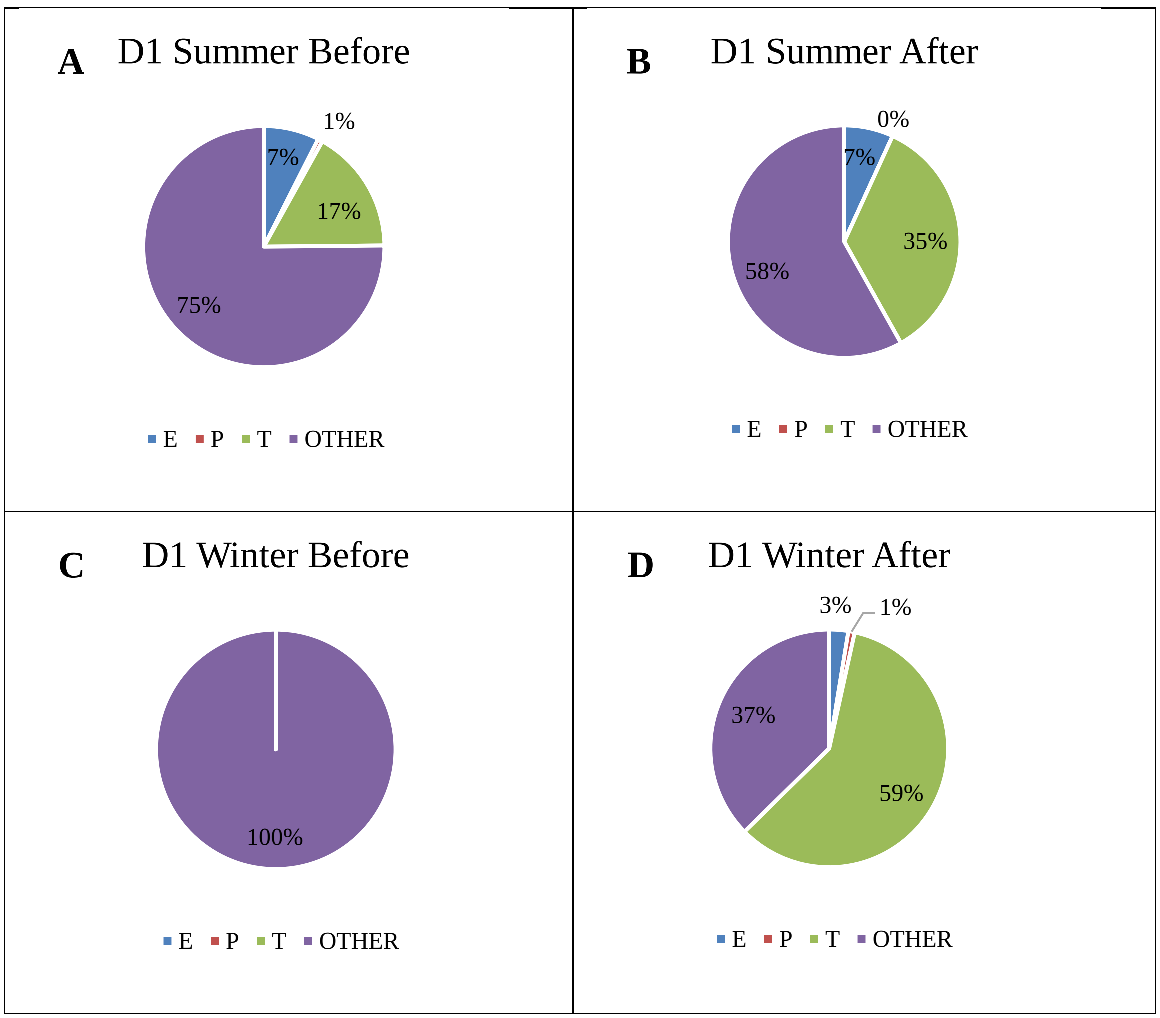

Figure 28. Percent composition for the Ephemeroptera (E), Plecoptera (P), Trichoptera (T), and other taxa based on total abundance for site D1 A) summer pre-restoration, B) summer post-restoration, C) winter pre-restoration, and D) winter post-restoration.

For C2, there were Ephemeroptera, Plecoptera, and Trichoptera taxa present before and after restoration in the summer and winter seasons. In the summer, Ephemeroptera taxa increased from 8% to 12%, Plecoptera taxa increased from 3% to 16%, and Trichoptera taxa decreased slightly from 38% to 33% (Figure 29A, Figure 28B). In winter, Ephemeroptera taxa increased from 12% to 32%, Plecoptera taxa increased from 8% pre-restoration and 12% post-restoration, and Trichoptera taxa decreased from 36% before and 21% after restoration (Figure 29C, Figure 28D).

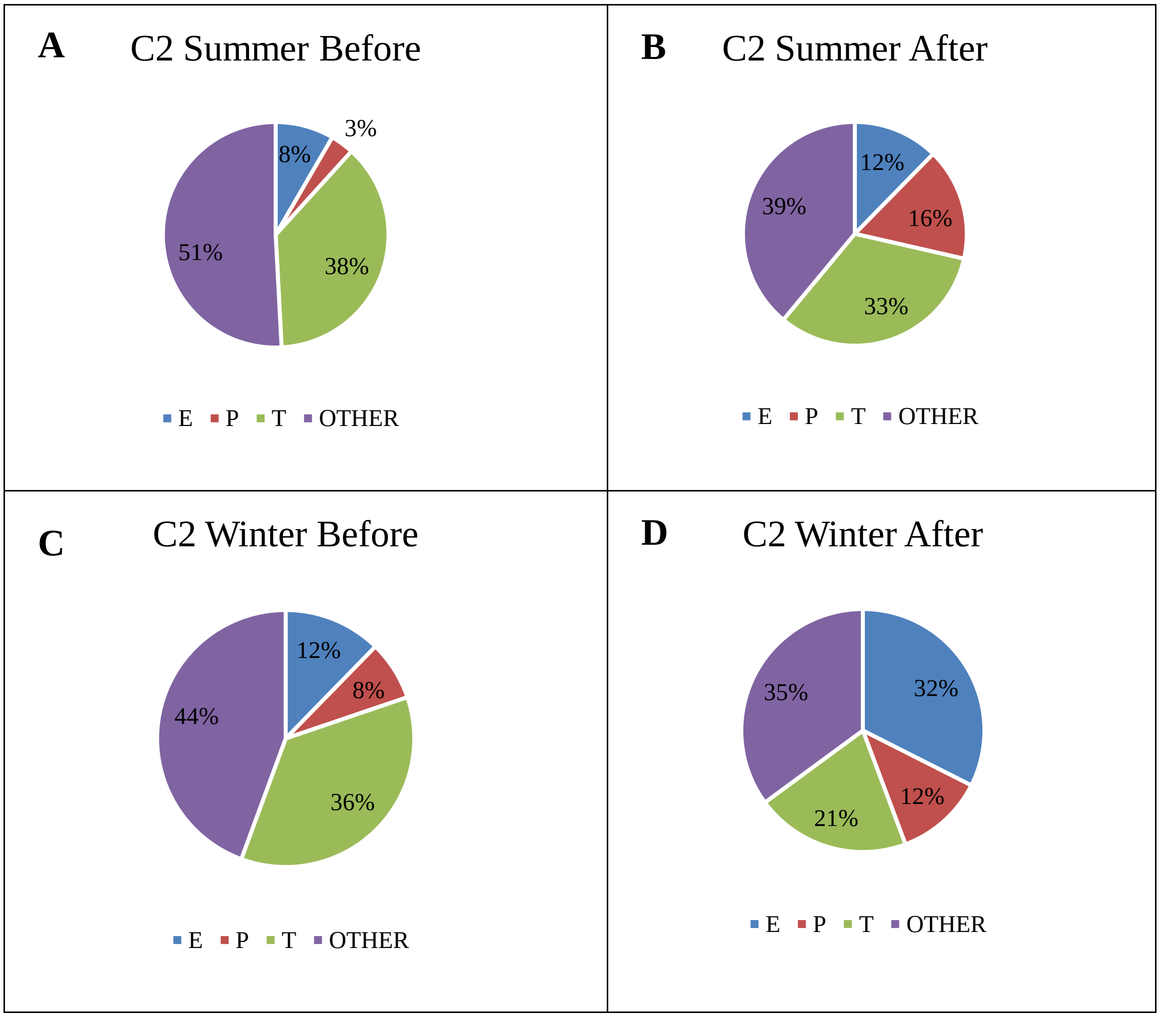

Figure 29. Percent composition for the Ephemeroptera (E), Plecoptera (P), Trichoptera (T), and other taxa based on total abundance for site C2 A) summer pre-restoration, B) summer post-restoration, C) winter pre-restoration, and D) winter post-restoration. **Note: C2 was not restored, therefore; the restoration timeline is reflective of C1.*

For C1, there were Ephemeroptera, Plecoptera, and Trichoptera taxa present before and after restoration in the summer and winter seasons. In the summer, Ephemeroptera taxa increased from 4% to 9%, Plecoptera taxa increased from 2% to 6%, and Trichoptera taxa increased from 13% to 33% (Figure 30A, Figure 30B). In winter, Ephemeroptera taxa increased from 5% to 30%, Plecoptera taxa decreased slightly from 4% pre-restoration and 2% post-restoration, and Trichoptera taxa decreased from 54% pre-restoration and 27% post-restoration (Figure 30C, Figure 30D).

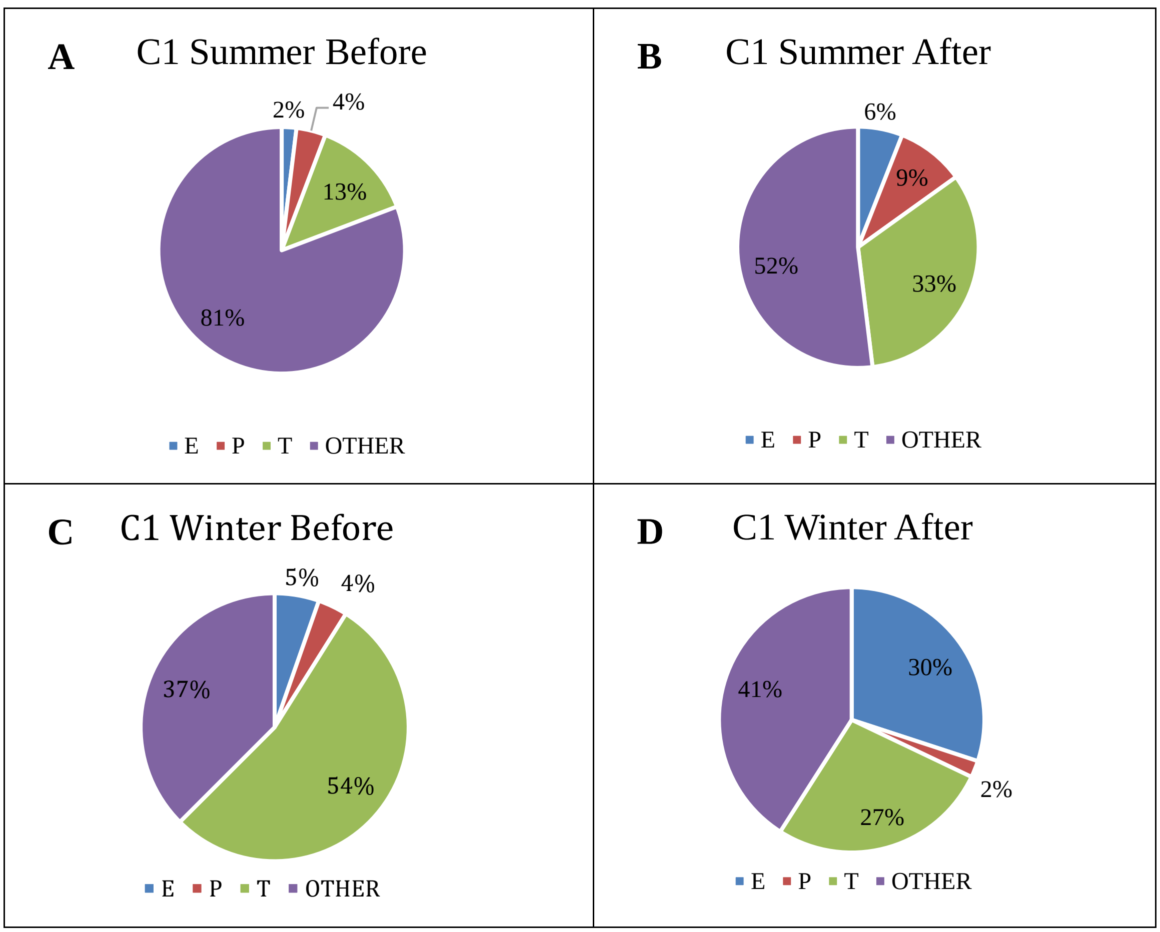

Figure 30. Percent composition for the Ephemeroptera (E), Plecoptera (P), Trichoptera (T), and other taxa based on total abundance for site C1 A) summer pre-restoration, B) summer post-restoration, C) winter pre-restoration, and D) winter post-restoration. **Note the only sampling event for summer pre-restoration was collected on 07/28/2016 and the only sampling event for winter pre-restoration was collected on 03/17/2017.*

For P1, during summer the percentage of Ephemeroptera decreased from 10% pre-restoration to 1% post-restoration, there was no Plecoptera taxa present before or after restoration, and the percentage of Trichoptera taxa present increased from 45% pre-restoration to 65% post-restoration (Figure 31A, Figure 31B). During winter, the percentage of Ephemeroptera present decreased from 14% pre-restoration to 0% post-restoration, there was no Plecoptera taxa present before or after restoration, and the percentage of Trichoptera taxa present decreased from 17% pre-restoration to 7% post-restoration (Figure 31C, Figure 31D).

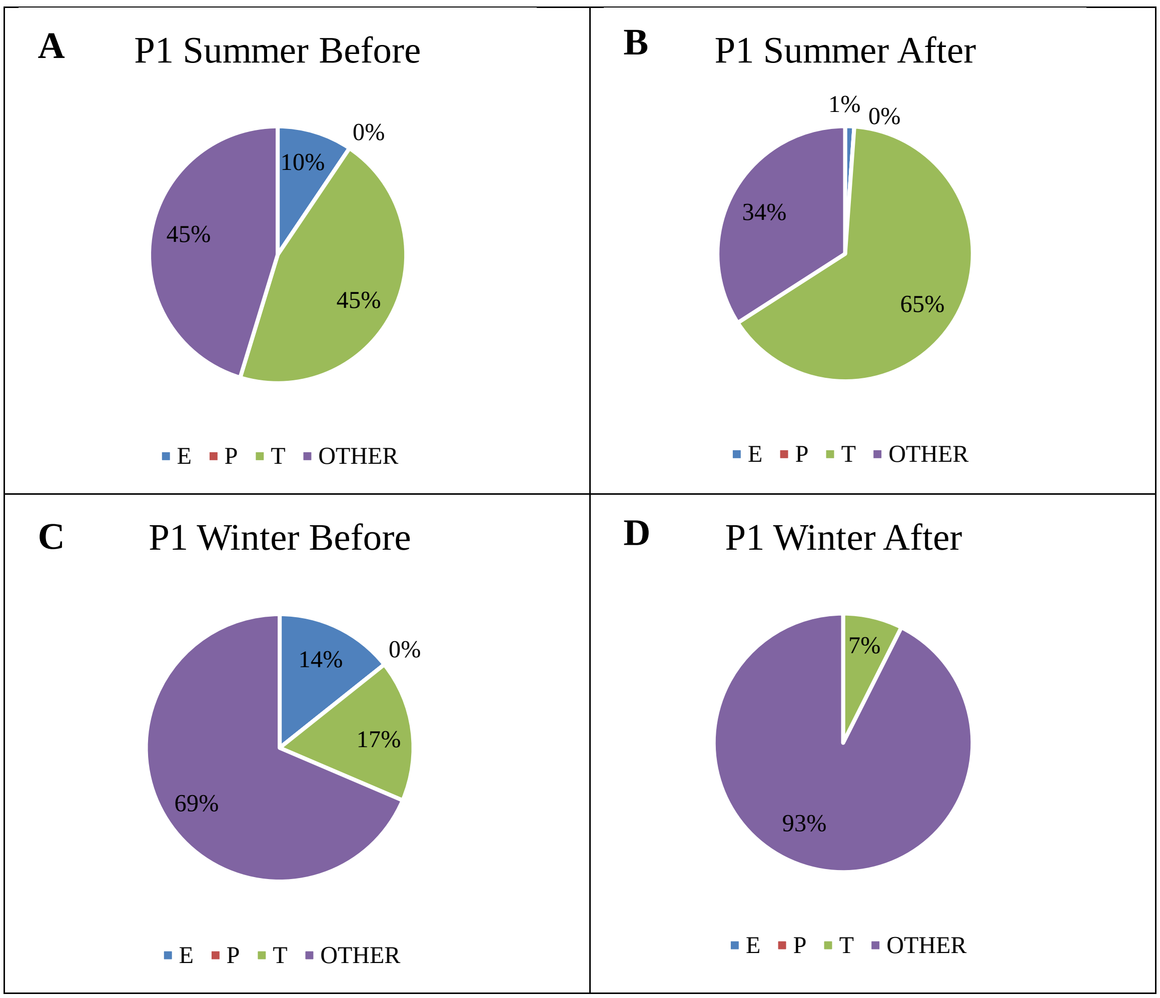

Figure 31. Percent composition for the Ephemeroptera (E), Plecoptera (P), Trichoptera (T), and other taxa based on total abundance for site P1 A) summer pre-restoration, B) summer post-restoration, C) winter pre-restoration, and D) winter post-restoration.

For A4, during summer the percentage of Ephemeroptera increased from 0% pre-restoration to 5% post-restoration, the was no Plecoptera taxa present before or after restoration, and the percentage of Trichoptera taxa present decreased from 83% to 12% (Figure 32A, Figure 32B). In the winter, the percentage of Ephemeroptera present increased from 5% pre-restoration to 8% post-restoration, the percentage of Plecoptera taxa present decreased from 31% to 0%, the percentage of Trichoptera taxa present decreased from 43% to 5% after restoration (Figure 32C, Figure 32D).

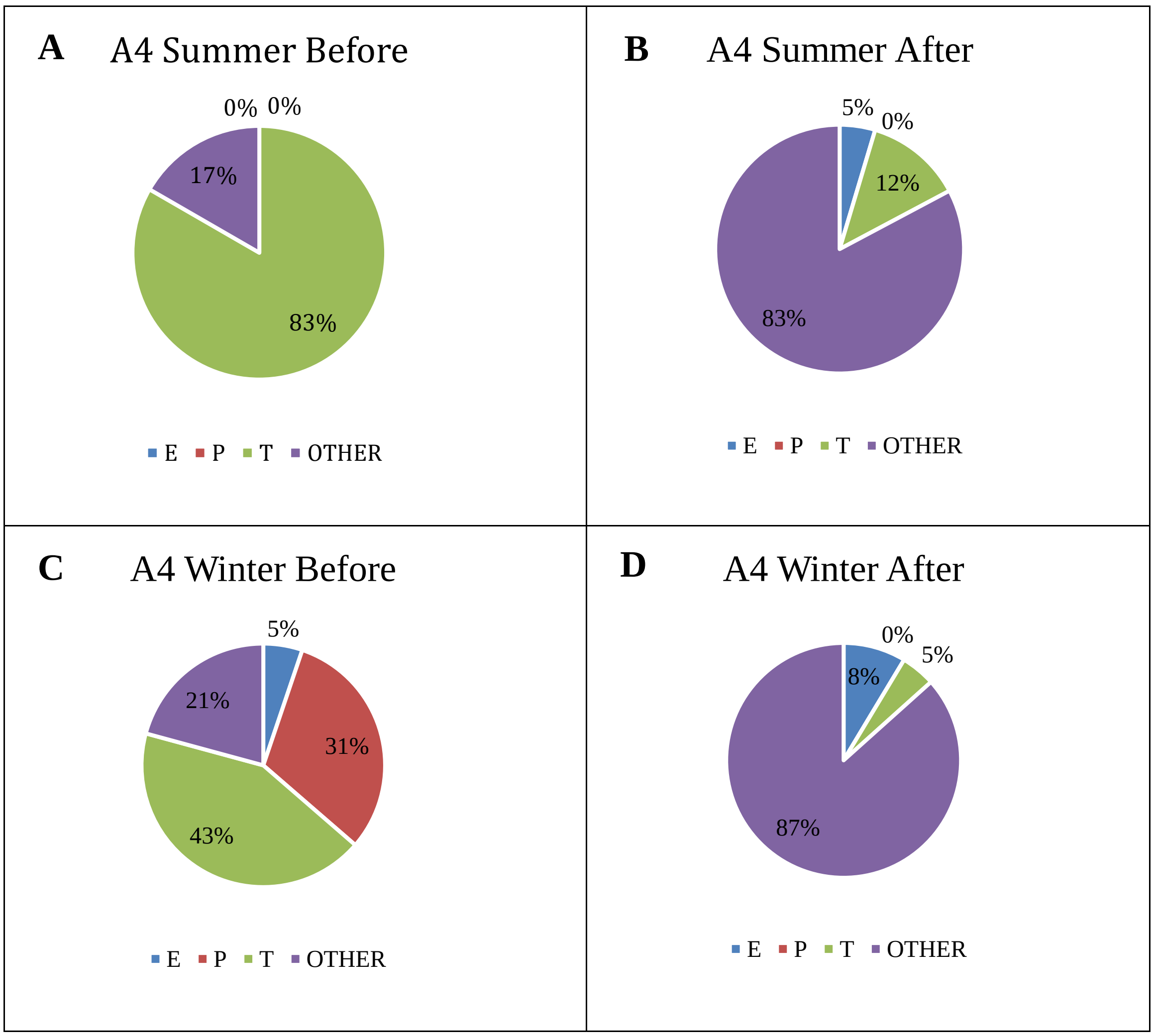

Figure 32. Percent composition for the Ephemeroptera (E), Plecoptera (P), Trichoptera (T), and other taxa based on total abundance for site A4 A) summer pre-restoration, B) summer post-restoration, C) winter pre-restoration, and D) winter post-restoration.

For A3, in the summer the percentage of Ephemeroptera increased from 2% pre-restoration to 5% post-restoration, the percentage of Plecoptera present decreased from 5% pre-restoration to 0% post-restoration, and the percentage of Trichoptera taxa present were similar (28%) before and after restoration (Figure 33A, Figure 33B). In the winter, the percentage of Ephemeroptera present decreased from 31% pre-restoration to 2% post-restoration, the percentage of Plecoptera taxa present decreased from 14% pre-restoration to 0% post-restoration, and the percentage of Trichoptera taxa present decreased from 23% pre-restoration to 4% post-restoration (Figure 33C, Figure 33D).

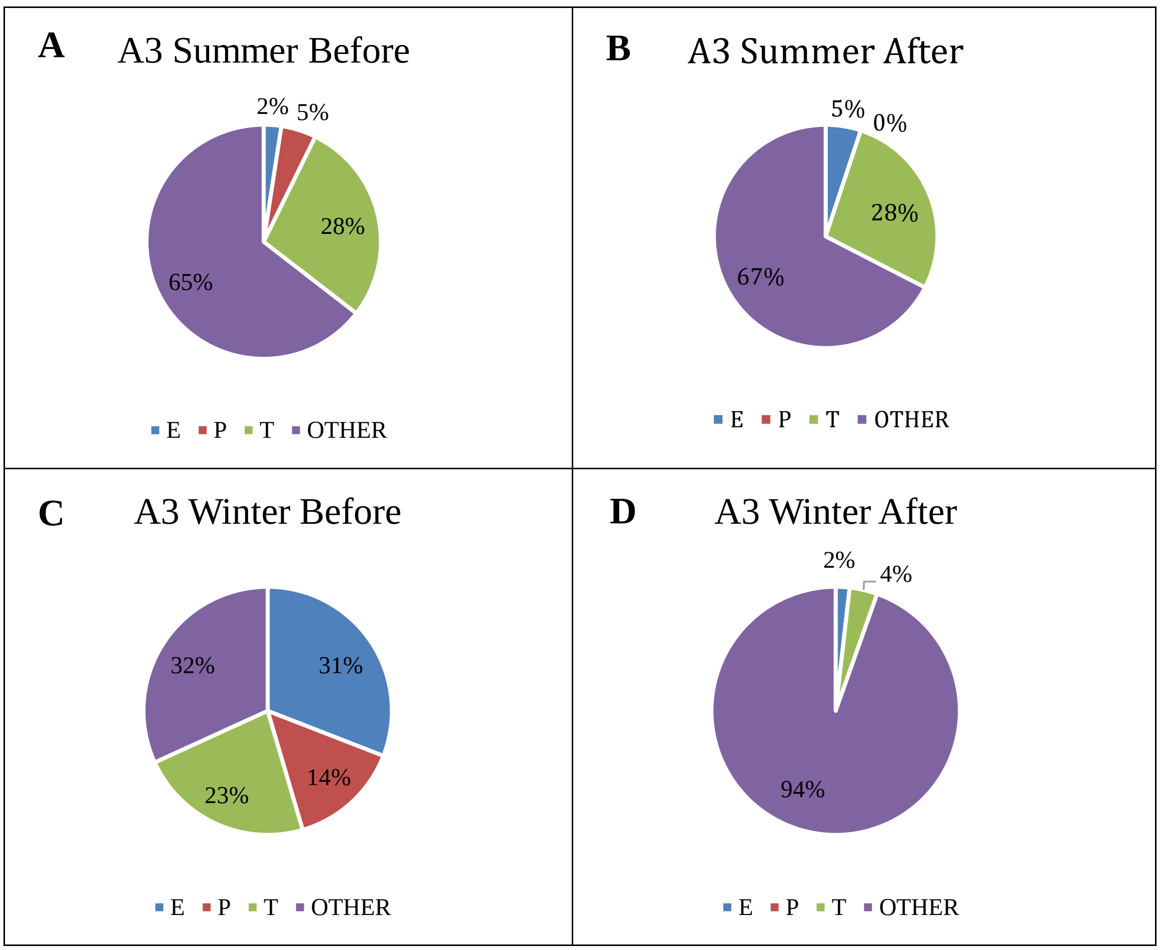

Figure 33. Percent composition for the Ephemeroptera (E), Plecoptera (P), Trichoptera (T), and other taxa based on total abundance for site A3 A) summer pre-restoration, B) summer post-restoration, C) winter pre-restoration, and D) winter post-restoration.

For A2, in the summer the percentage of Ephemeroptera decreased from 10% pre-restoration to 1% post-restoration, the percentage of Plecoptera present decreased from 2% pre-restoration to 0% post-restoration, and the percentage of Trichoptera taxa present decreased from 21% pre-restoration to 13% post-restoration (Figure 34A, Figure 34B). In the winter, the percentage of Ephemeroptera present increased from 6% pre-restoration to 9% post-restoration, the percentage of Plecoptera taxa present decreased from 35% pre-restoration to 0% post-restoration, and the percentage of Trichoptera taxa present decreased from 13% pre-restoration to 8% post-restoration (Figure 34C, Figure 34D).

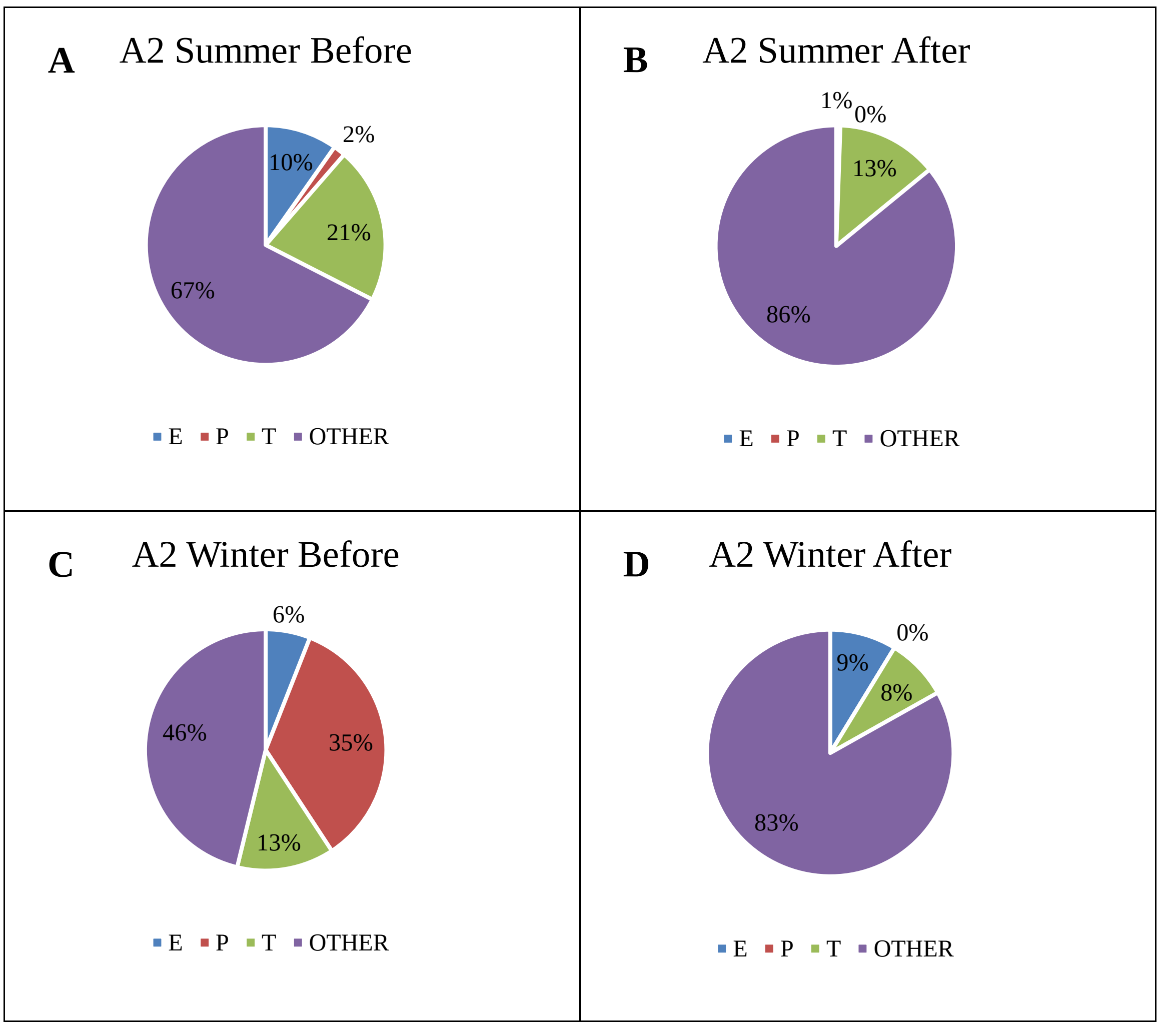

Figure 34. Percent composition for the Ephemeroptera (E), Plecoptera (P), Trichoptera (T), and other taxa based on total abundance for site A2 A) summer pre-restoration, B) summer post-restoration, C) winter pre-restoration, and D) winter post-restoration.

For A1, during summer the percentage of Ephemeroptera increased from 13% pre-restoration to 26% post-restoration, the percentage of Plecoptera taxa did not change at 0%, and the percentage of Trichoptera taxa present increased from 7% pre-restoration to 43% post-restoration (Figure 35A, Figure 35B). In the winter, the percentage of Ephemeroptera present decreased from 58% pre-restoration to 17% post-restoration, the percentage of Plecoptera taxa present decreased from 17% pre-restoration to 0% post-restoration, and the percentage of Trichoptera taxa present increased from 1% pre-restoration to 15% post-restoration (Figure 35C, Figure 35D).

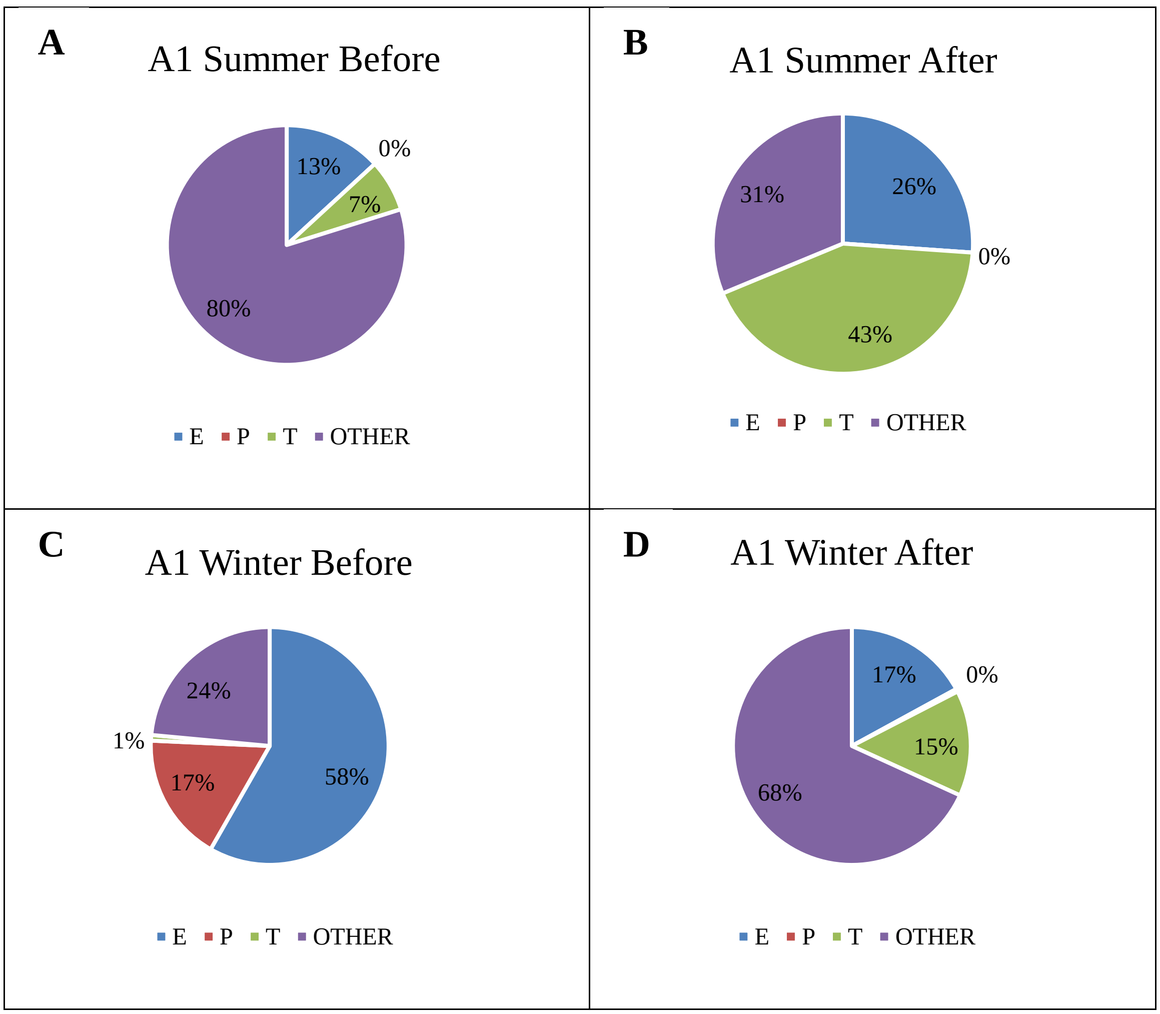

Figure 35. Percent composition for the Ephemeroptera (E), Plecoptera (P), Trichoptera (T), and other taxa based on total abundance for site A1 A) summer pre-restoration, B) summer post-restoration, C) winter pre-restoration, and D) winter post-restoration.

For R2, during summer the percentage of Ephemeroptera increased from 20% pre-restoration to 21% post-restoration, the percentage of Plecoptera taxa did not change, and the percentage of Trichoptera taxa present increased from 26% pre-restoration to 52% post-restoration (Figure 36A, Figure 36B). In winter, the percentage of Ephemeroptera present decreased from 29% pre-restoration to 27% post-restoration, the percentage of Plecoptera taxa present decreased from 3% pre-restoration to 0% post-restoration, and the percentage of Trichoptera taxa present increased from 12% pre-restoration to 18% post-restoration (Figure 36C, Figure 36D).

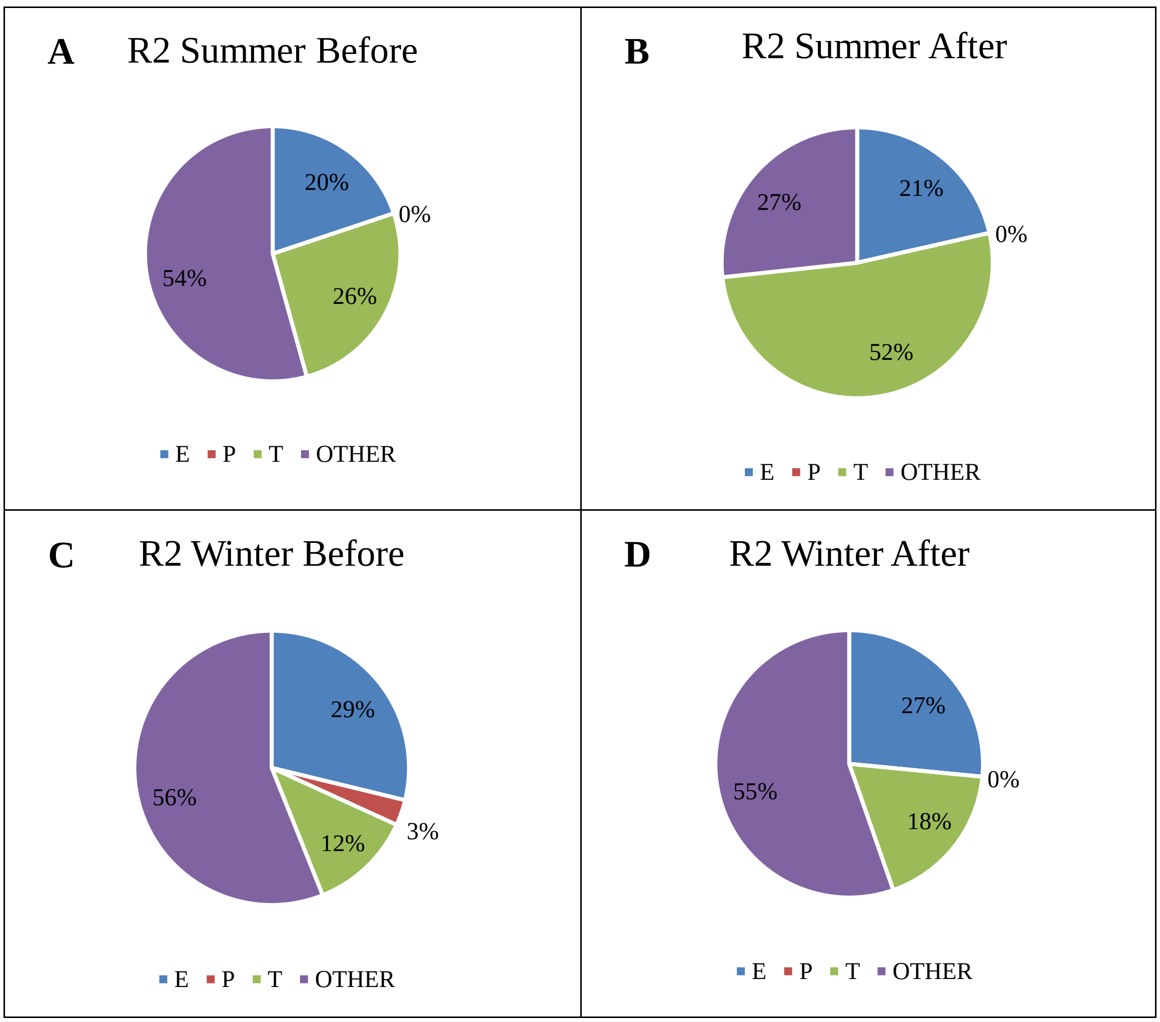

Figure 36. Percent composition for the Ephemeroptera (E), Plecoptera (P), Trichoptera (T), and other taxa based on total abundance for site R2 A) summer pre-restoration, B) summer post-restoration, C) winter pre-restoration, and D) winter post-restoration.

For R1, in the summer the percentage of Ephemeroptera increased from 18% pre-restoration to 41% post-restoration, the percentage of Plecoptera taxa did not change, and the percentage of Trichoptera taxa present increased from 7% pre-restoration to 12% post-restoration (Figure 37A, Figure 37B). In the winter, the percentage of Ephemeroptera present increased from 55% pre-restoration to 60% post-restoration, the percentage of Plecoptera taxa present decreased from 17% pre-restoration to 0% post-restoration, and the percentage of Trichoptera taxa present decreased from 12% pre-restoration to 10% post-restoration (Figure 37C, Figure 37D).

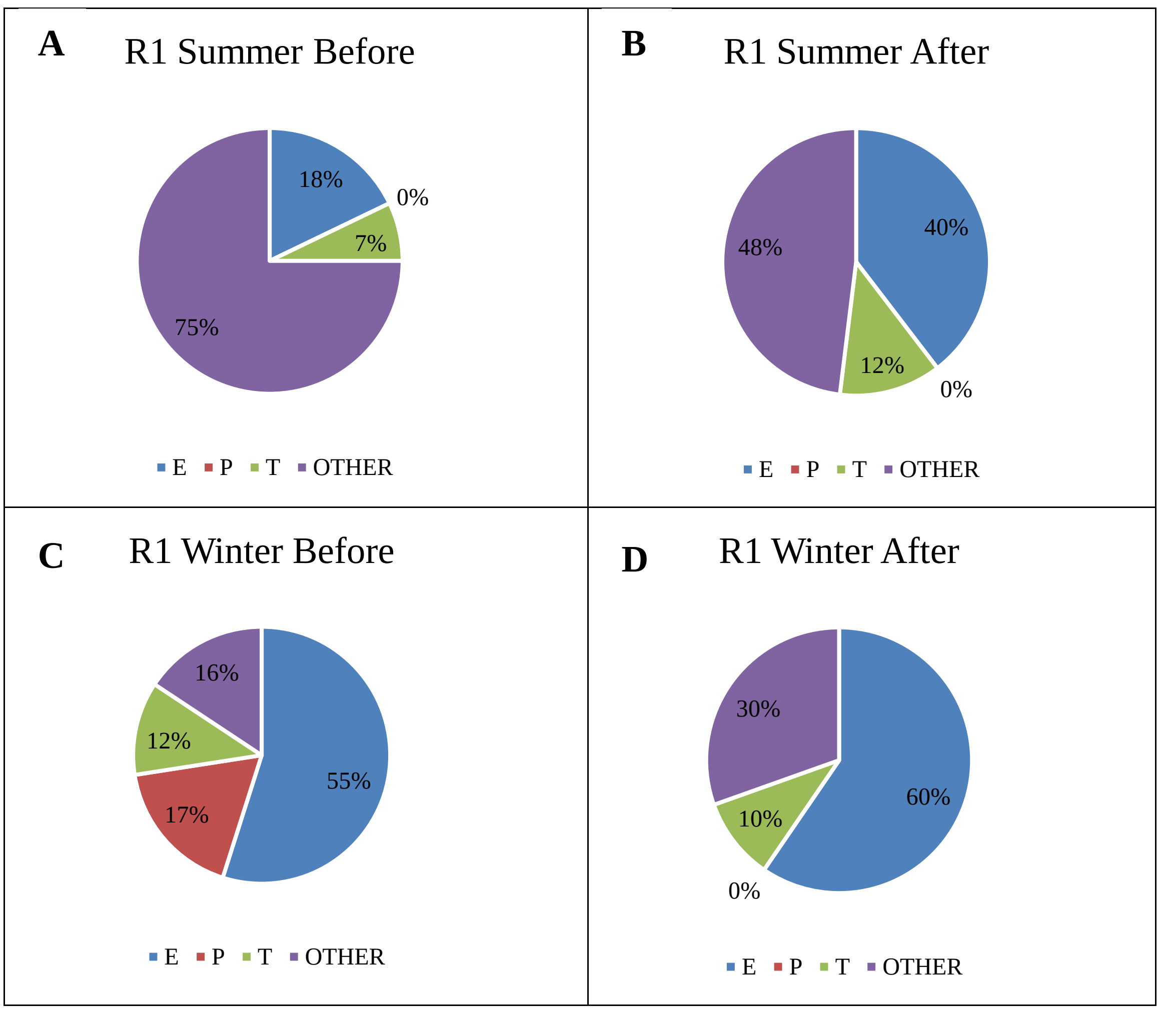

Figure 37. Percent composition for the Ephemeroptera (E), Plecoptera (P), Trichoptera (T), and other taxa based on total abundance for site R1 A) summer pre-restoration, B) summer post-restoration, C) winter pre-restoration, and D) winter post-restoration.

7.1.5: NCBI Bioclassification

Across the development sub-watershed (D2, D1), NCBI values increased following restoration (Figure 38). From 3.84 to 7.83 pre-restoration to 5.61-7.58 post-restoration. For D2, the average NCBI values increased from 5.99 pre-restoration to 7.18 post-restoration. For D1, the average NCBI values increased from 6.73 pre-restoration to 7.01 post-restoration.

Across the forested control sub-watershed (C2, C1), NCBI values ranged from 3.81 to 6.64 pre-restoration and ranged from 3.40 to 7.11 post-restoration (Figure 39). There was a significant difference between NCBI values post-restoration between C2 and C1 (Table 24, t-test, p=0.029*, α=0.05). C2 had lower NCBI values than C1 post-restoration (Figure 46).

Across the pond influence sub-watershed (P1), NCBI values ranged from 5.55 to 7.58 pre-restoration and 6.58 to 7.58 post-restoration (Figure 40). Overall P1 average NCBI value increased from 6.62 to 7.18 post-restoration.

Across the agricultural sub-watershed, NCBI values ranged from 3.30 (A4) to 7.84 (A2) pre-restoration and ranged from 3.80 (A4) to 8.46 (A3) post-restoration (Figure 41). For site A4, the average NCBI value increased from 4.01 to 7.15 post-restoration (Figure 44). There was a significant difference in NCBI values before and after restoration for all seasonal data (Table 23, t-test, p=0.001, α=0.05) and there was a significant difference in NCBI values in the winter before and after restoration (Table 23, t-test, p=0.001, α=0.05). For site A3, the average NCBI value increased from 5.17 pre-restoration to 7.45 post-restoration (Figure 45). For site A3, there was a significant difference in NCBI values before and after restoration for all seasonal data (Table 23, t-test, *p*=0.008, α=0.05) and there was a significant difference in NCBI values in the winter before and after restoration (Table 23, t-test, *p*=0.011, α=0.05). For site A2, the average NCBI value increased from 6.24 pre-restoration to 6.95 post-restoration. For site A1, the average NCBI value increased from 6.06 pre-restoration to 6.45 post-restoration. Overall, for the agricultural sub-watershed NCBI values increased after restoration.

Across the mainstem sub-watershed, NCBI values ranged from 4.55 (R1) to 7.07 (R1) pre-restoration and 5.15 (R1) to 6.89 (R2) post-restoration (Figure 42). For site R2, the average NCBI value increased from 6.15 pre-restoration to 6.51 post-restoration. For site R1, the average NCBI value decreased from 6.17 pre-restoration to 6.08 post-restoration.

Based on the NCBI bioclassification, prior to restoration most of the 11 sites were deemed ‘fair’, ‘good-fair’, or ‘excellent’ (depending on site and season) and after restoration most of the 11 sites were deemed ‘poor’ or ‘fair’ with no sites being deemed as ‘excellent’ after January 2019 (Figure 43).

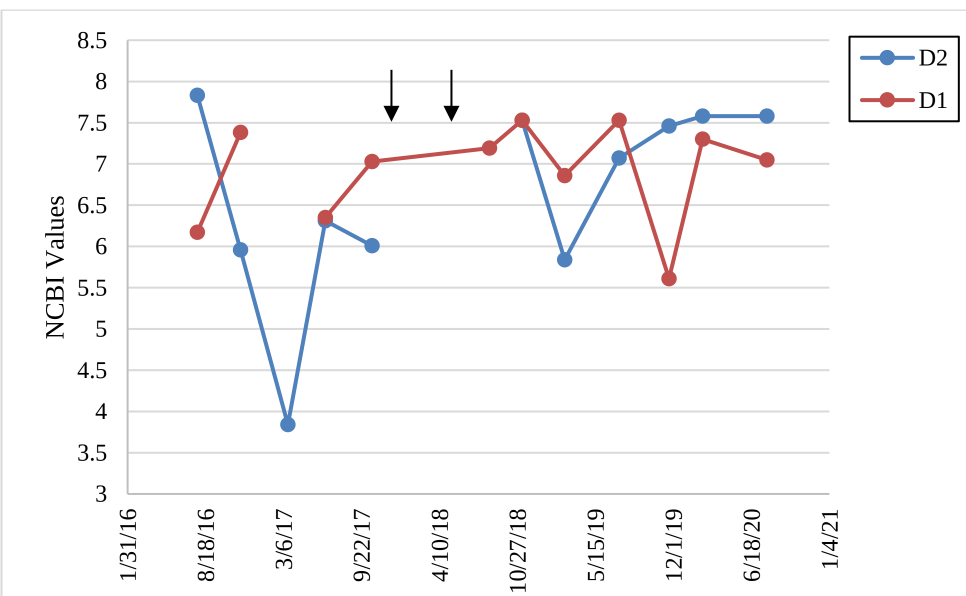

Figure 38. NCBI values for the development influence sub-watershed from 2016-2020. Black arrows represent the start and end date of restoration construction, respectively.

Across the forested control sub-watershed, abundance ranged from 3.81 (C2) to 6.64 (C1) pre-restoration and ranged from 3.40 (C2) to 7.11 (C1) post-restoration (Figure 39). There was a significant difference between NCBI values post-restoration between C2 and C1 (Table 24, t-test, p=0.029*, α=0.05). C2 had lower NCBI values than C1 post-restoration (Figure 46).

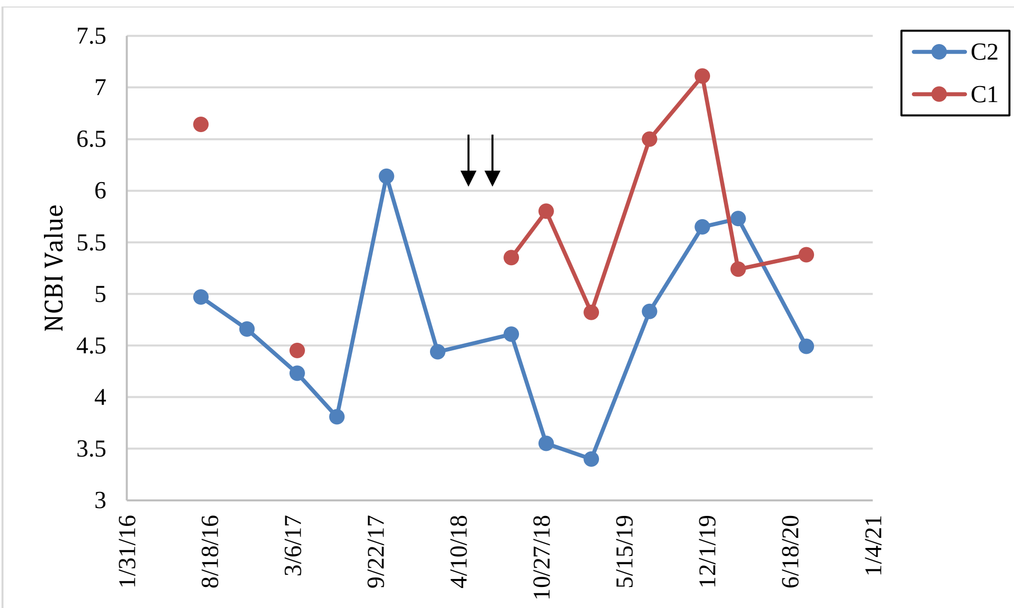

Figure 39. NCBI values for the control sub-watershed from 2016-2020. Black arrows represent the start and end date of restoration construction respectively for C1. *Note* C2 was not restored.*

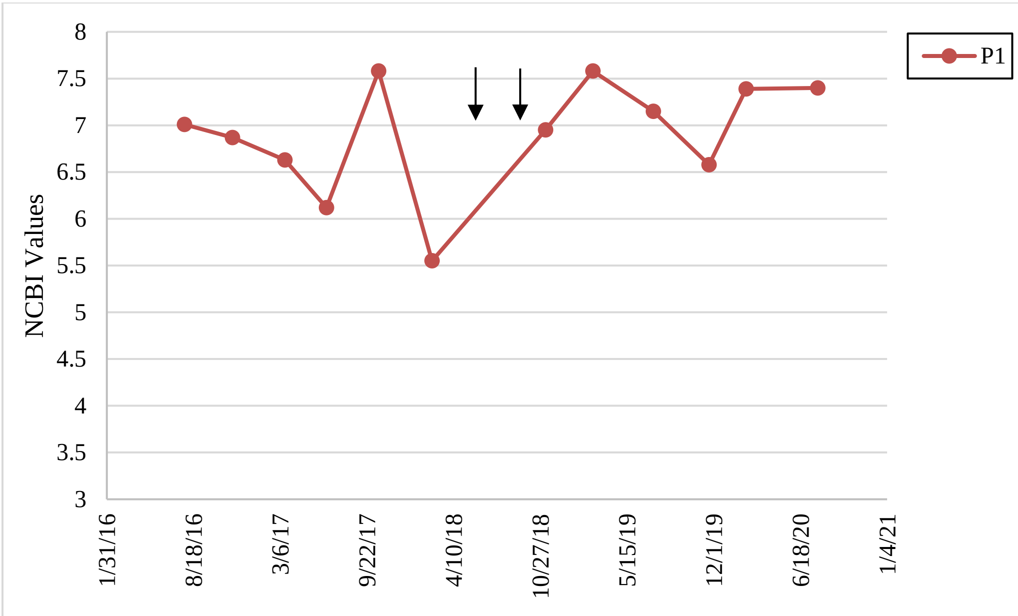

Figure 40. NCBI values for the pond influence sub-watershed from 2016-2020. Black arrows represent the start and end date of restoration construction, respectively.

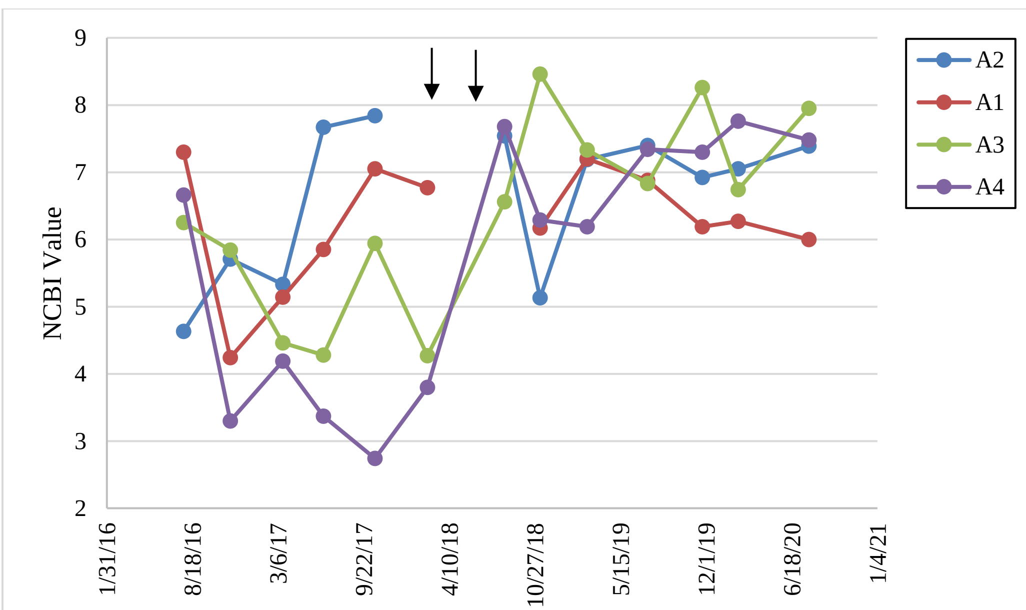

Figure 41. NCBI values for the agricultural influence sub-watershed from 2016-2020. Black arrows represent the start and end date of restoration construction, respectively.

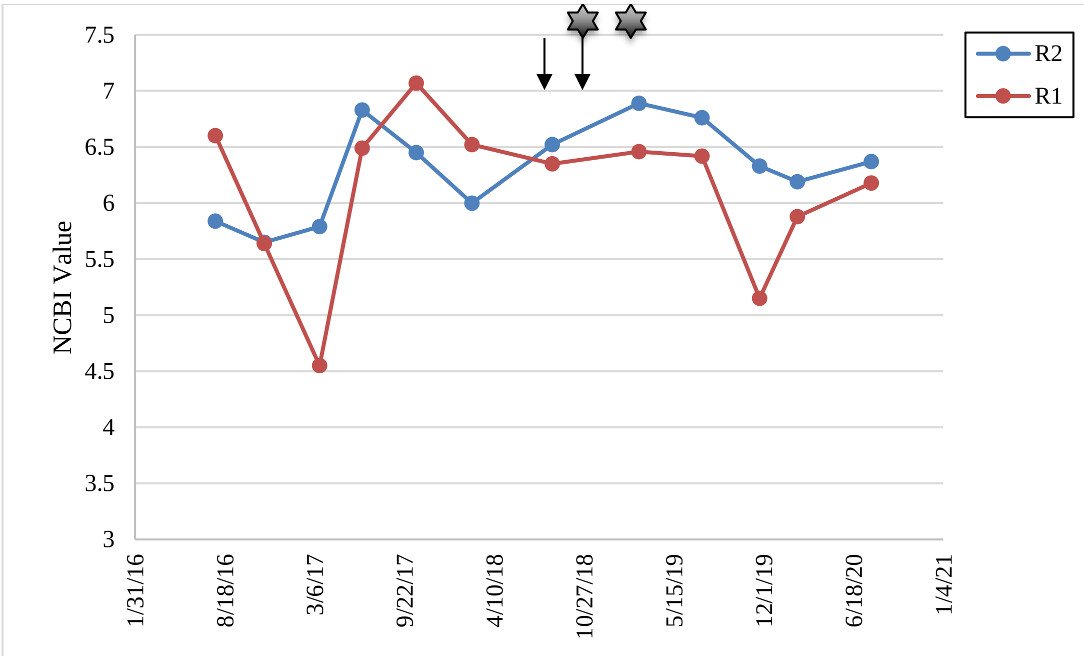

Figure 42. NCBI values for the Reedy influence (mainstem) sub-watershed from 2016-2020. Black arrows represent the start and end date of restoration construction respectively for site R2. Black stars represent the start and end data of restoration construction respectively for site R1.

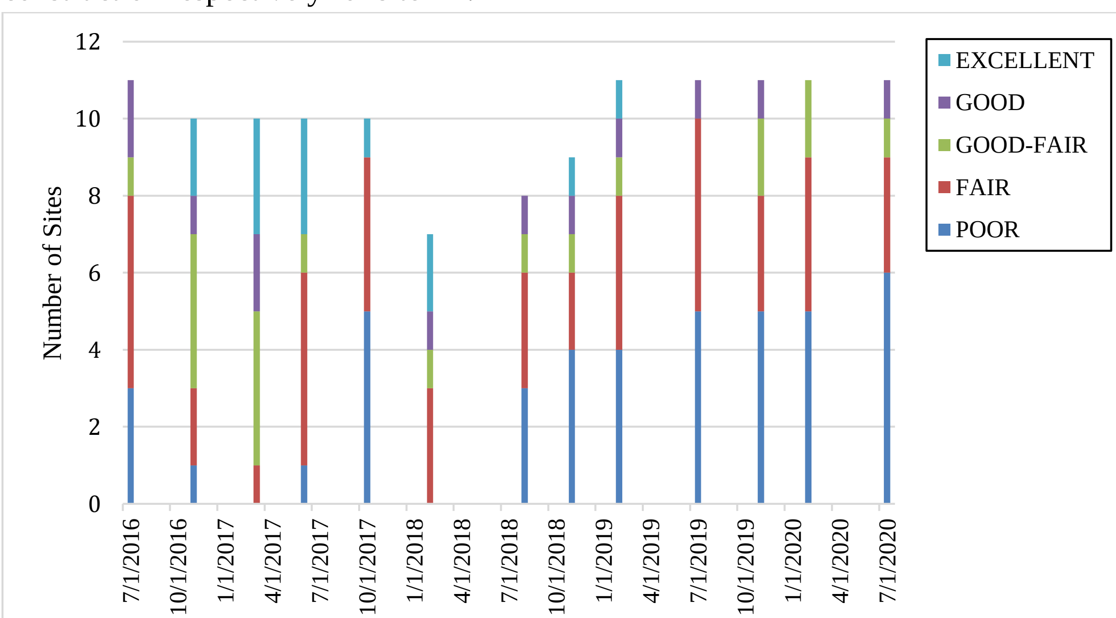

Figure 43. NCBI bioclassification based on small stream criteria for all sites across all sampling periods.

Table 23. *p*-values obtained from running a two-sample t-test assuming unequal variances on the difference between the average NCBI value pre-restoration and post-restoration for all 11 surface water sites. Blanks indicate there were not enough replicates to perform a t-test. **Indicates significant differences.*

SEASON	**SITE**								
	D2	**D1**	**P1**	**A4**	**A3**	**A2**	**A1**	**R2**	**R1**
ALL	0.139	0.488	0.137	***0.001****	***0.0008****	0.360	0.480	0.131	0.701
WINTER	0.304		0.193	***0.001****	***0.011****	0.113	0.303	0.069	0.729
SUMMER	0.398	0.089	0.489	0.117	0.095	0.557	0.672	0.624	0.172

Table 24. *p*-values obtained from running a two-sample t-test assuming unequal variances on the difference between the average taxa richness post-restoration between sites C2 and C1. Blanks indicate there were not enough replicates to perform a t-test. **Indicates significant differences.*

SEASON	**C2/C1 POST**
ALL	***0.029****
WINTER	0.203
SUMMER	0.107

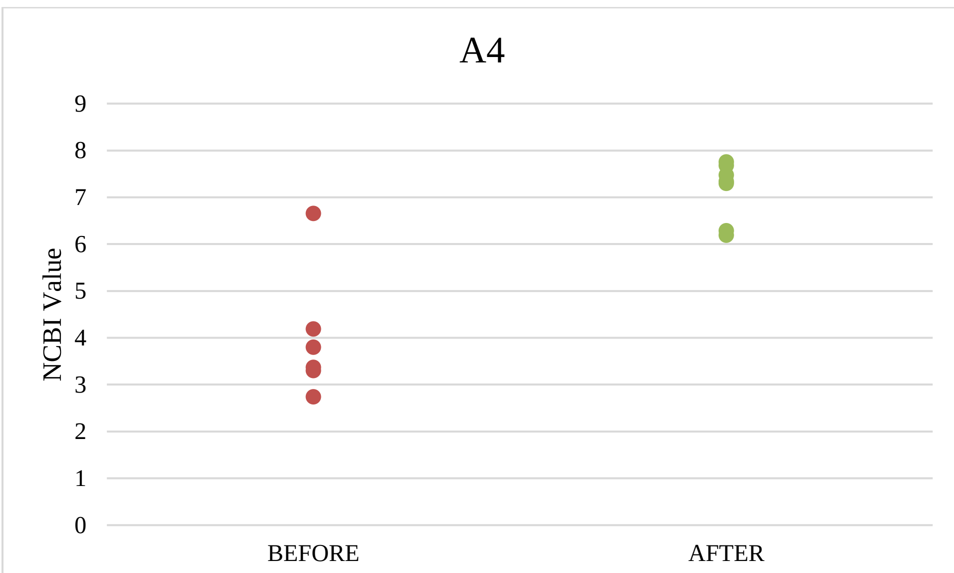

Figure 44. Dot plot showing significant difference in the average NCBI values at site A4 in all before and after restoration data as well as the winter season before and after restoration (*p*=0.001, α=0.05).

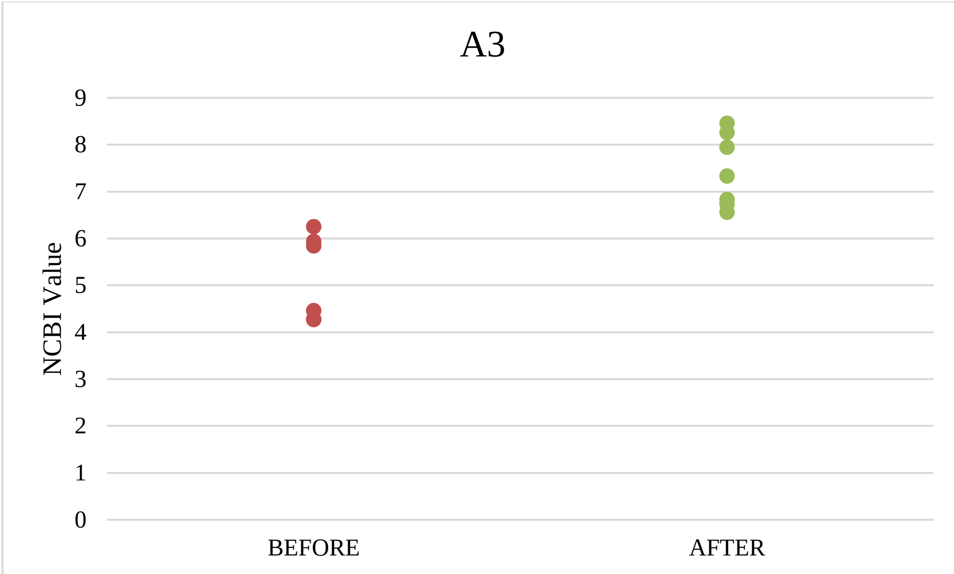

Figure 45. Dot plot showing significant difference in the average NCBI values at site A3 in all before and after restoration data as well as the winter season before and after restoration (*p*=0.0008, α=0.05; *p*=0.001, α=0.05).

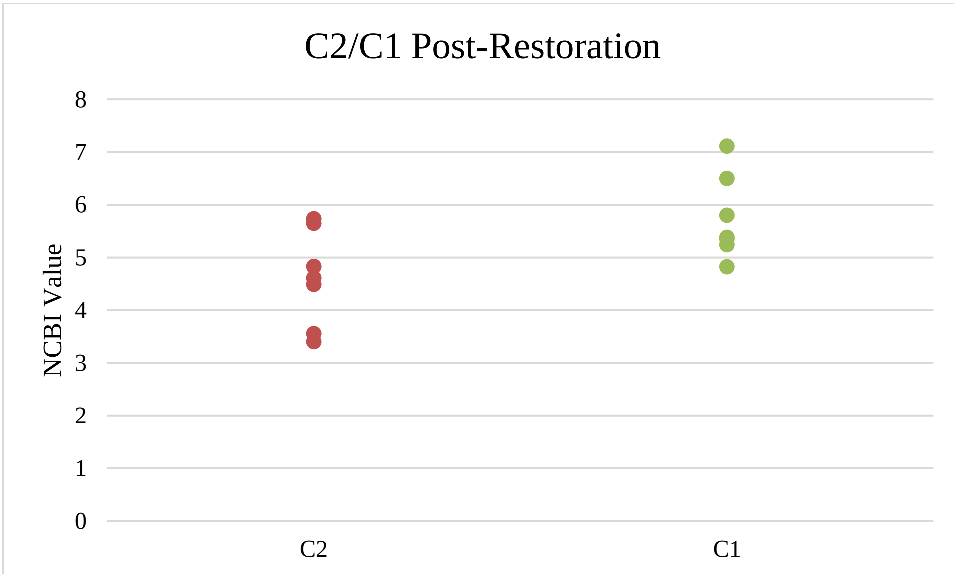

Figure 46. Dot plot showing significant difference in the average NCBI value between all post-restoration data comparing sites C2 and C1 (*p*=0.029, α=0.05).

7.1.6: Biomass

After restoration, the total EPT biomass increased across the watershed (Figure 47). The average EPT biomass before restoration across all sites in the watershed was 364.95 (mg/m^2) and after restoration the average EPT biomass was 872.88 (mg/m^2) (Table 25, Table 26).

After restoration, Trichoptera biomass and Ephemeroptera biomass increased while Plecoptera biomass decreased (Figure 48). Trichoptera average biomass was 232.76 (mg/m^2) pre-restoration and increased to 470.97 (mg/m^2) post-restoration. Ephemeroptera average biomass was 105.58 (mg/m^2) pre-restoration and increased to 368.05 post-restoration. Plecopteran average biomass was 26.60 (mg/m^2) pre-restoration and decreased to 13.86 (mg/m^2) post-restoration (Table 27, Table 28). Overall, there were very few Plecoptera taxa present across the watershed and therefore very little biomass before and after restoration in comparison to the amount of Trichoptera and Ephemeroptera biomass.

Table 25. Sum of Ephemeroptera, Plecoptera, and Trichoptera biomass (mg/m^2) across all dates and sites influenced by agricultural and forested control land-use. Blanks indicate either no EPT taxa were collected during the sampling period or the EPT taxa collected was damaged and could not be measured for biomass analysis.

		A4	A3	A2	A1	C1	C2
07/2016	E		2.38	0.16	2.93		5.59
	P		4.20	2.36		1.43	1.74
	T		4.62	53.06	4.72	1.72	8.60
	TOTAL		**11.19**	**55.58**	**7.65**	**3.14**	**15.93**
11/2016	E			5.82	1.06		4.66
	P	0.14	0.89	16.73	7.07		8.05
	T			7.99			9.17
	TOTAL	**0.14**	**0.89**	**30.55**	**8.13**		**21.88**
03/2017	E	3.03	22.07	4.48	320.33	15.19	7.40
	P	10.54	3.06	2.78	69.63	0.14	1.32
	T	37.36	49.46	70.69	47.06	114.67	68.29
	TOTAL	**50.94**	**74.59**	**77.95**	**437.02**	**130**	**77.01**
06/2017	E		2.84				19.30

	P		1.37				0.54
	T	2.78	6.01		1.36		79.92
	TOTAL	**2.78**	**10.23**		**1.36**		**99.76**
10/2017	E			4.73	7.78		9.39
	P						1.44
	T	3.37			3.73		3.97
	TOTAL	**3.37**		**4.73**	**11.52**		**14.81**
02/2018	E		42.34		16.07		49.04
	P						54.96
	T	0.23	6.87		2.45		48.96
	TOTAL	**0.23**	**49.21**		**18.51**		**152.97**
08/2018	E	1.25	14.44			0.35	2.89
	P						
	T					17.68	46.24
	TOTAL	**1.25**	**14.44**			**18.03**	**49.13**
11/2018	E	3.61		0.69	1.76	98.03	17.70
	P						12.74
	T	3.52	1.02	7.26	37.72	56.52	43.06
	TOTAL	**7.12**	**1.02**	**7.95**	**39.48**	**154.55**	**73.50**
02/2019	E	15.2	9.17	5.14		105.77	126.95
	P					2.34	1.15
	T	20.27	7.04	17.16	22.56	26.89	31.94
	TOTAL	**35.48**	**16.21**	**22.29**	**22.56**	**135.00**	**160.00**
07/2019	E	17.34	4.89	0.29	4.31	7.92	5.93
	P					6.32	4.28
	T	54.89	397.33	69.32	206.49	239.41	12.05
	TOTAL	**72.24**	**402.22**	**69.62**	**210.79**	**253.65**	**22.25**
11/2019	E			3.09	5.29	2.65	
	P				0.68		0.33
	T			1.92		19.86	1.04
	TOTAL			**5.01**	**5.96**	**22.52**	**1.36**
02/2020	E	1.33	0.36	61.34	152.11	19.35	152.92
	P					26.58	
	T			34.64	19.00	55.33	119.11
	TOTAL	**1.33**	**0.36**	**95.98**	**171.11**	**101.26**	**272.04**
07/2020	E	0.34	0.21	0.63	13.99	5.46	17.62
	P					19.77	7.00
	T		1.72	8.35		12.08	55.38
	TOTAL	**0.34**	**1.93**	**8.98**	**13.99**	**38.31**	**80.00**

Table 26. Sum of Ephemeroptera, Plecoptera, and Trichoptera biomass (mg/m^2) across all dates and sites influenced by development and the mainstem land-use. Blanks indicate either no EPT taxa were collected during the sampling period or the EPT taxa collected was damaged and could not be measured for biomass analysis.

		D2	D1	P1	R2	R1
07/2016	E				2.03	8.28
	P					
	T				14.06	7.62
	TOTAL				**16.09**	**15.89**
11/2016	E					5.71
	P				2.66	1.35
	T				1.48	8.91
	TOTAL				**4.14**	**15.98**
03/2017	E	4.92		3.58	32.56	29.83
	P					6.99
	T	0.84			2.76	3.32
	TOTAL	**5.77**		**3.58**	**35.32**	**40.14**
06/2017	E	7.84	0.34	5.96		0.87
	P					
	T	15.84	16.24	22.58	4.82	4.05
	TOTAL	**23.68**	**16.57**	**28.54**	**4.82**	**4.92**
10/2017	E		2.07		15.42	3.41
	P					
	T	0.49	11.5		43.32	
	TOTAL	**0.49**	**13.6**		**58.74**	**3.41**
02/2018	E			4.15	11.38	6.31
	P					
	T			87.09	14.26	
	TOTAL			**91.23**	**25.65**	**6.31**
08/2018	E		4.94		2.96	0.46
	P		0.72			
	T		8.15		2.12	0.90
	TOTAL		**13.81**		**5.08**	**1.37**
11/2018	E		4.25			
	P					
	T	428.26	310.51	2.86		
	TOTAL	**428.26**	**314.76**	**2.86**		
02/2019	E		3.49			9.72
	P					
	T	79.71	101.45	4.98		
	TOTAL	**79.71**	**104.95**	**4.98**		**9.72**
07/2019	E				17.35	35.88
	P					
	T	43.44	7.65	427.1	109.1	13.31
	TOTAL	**43.44**	**7.65**	**427.1**	**126.4**	**49.19**
11/2019	E	2.11	2.82		25.42	93.47
	P		0.84			
	T	10.72	1.26		19.98	11.33
	TOTAL	**12.83**	**4.91**		**45.41**	**104.8**
02/2020	E		3.84		275.1	554.5
	P					
	T	9.81	1.69	1.55	76.59	37.64
	TOTAL	**9.81**	**5.53**	**1.55**	**351.7**	**592.1**
07/2020	E	3.59	6.35	5.42	24.44	37.13

P					
T	47.33	0.74	4.94	2.06	7.77
TOTAL	**50.2**	**7.09**	**10.36**	**26.49**	**44.89**

Table 27. Mean ± S.D. of Ephemeroptera, Plecoptera, and Trichoptera biomass (mg/m^2) across all dates and sites influenced by agricultural and forested control land-use. Blanks indicate either no EPT taxa was collected during the sampling period or the EPT taxa collected was damaged and could not be measured for biomass analysis. **indicates there was no standard deviation as only one organism was measured per the collected sample.*

		A4	**A3**	**A2**	**A1**	**C1**	**C2**
07/2016	E		1.19 ± 1.54	0.16 ± *	1.46 ± 0.84		5.59 ± *
	P		4.2 ± *	2.36 ± *		1.43 ± *	1.74 ± *
	T		2.31 ± 2.1	17.69 ± 21.1	2.36 ± 2.21	1.71 ± *	8.60 ± *
11/2016	E			2.91 ± 3.55	1.06 ± *		2.33 ± 2.79
	P	0.14 ± *	0.89 ± *	5.58 ± 6.85	7.07 ± *		2.68 ± 1.75
	T			3.99 ± 5.07			9.17 ± *
03/2017	E	1.52 ± 1.03	7.36 ± 7.18	1.49 ± 1.57	80.08 ± 88.9	7.59 ± 10.6	2.46 ± 3.21
	P	3.51 ± 4.73	1.02 ± 0.84	1.39 ± 1.48	23.21 ± 17.5	0.14 ± *	0.44 ± 0.33
	T	12.45 ± 13.2	24.73 ± 24.1	35.34 ± 7.88	47.06 ± *	57.34 ± 10.24	22.76 ± 35.60
06/2017	E		2.84 ± *				19.30 ± *
	P		1.37 ± *				0.54 ± *
	T	2.78 ± *	3.00 ± 0.56		1.36 ± *		26.64 ± 42.5
10/2017	E			4.74 ± *	3.89 ± 4.34		9.39 ± *
	P						1.43 ± *
	T	3.37 ± *			3.73 ± *		1.99 ± 1.60
02/2018	E		21.17 ± 18.9		8.03 ± 2.47		24.52 ± 26.19
	P						54.96 ± *
	T	0.23 ± *	1.72 ± 2.11		1.22 ± 1.54		9.79 ± 5.61
08/2018	E	1.25 ± *	14.44 ± *			0.35 ± *	1.44 ± 1.45
	P						
	T					17.68 ± *	9.25 ± 3.73
11/2018	E	1.8 ± 1.5		0.69 ± *	1.76 ± *	32.68 ± 44.3	4.43 ± 7.76
	P						6.37 ± 4.82
	T	1.76 ± 1.62	0.51 ± 0.26	7.26 ± *	12.57 ± 19.2	18.84 ± 28.61	21.53 ± 23.73
02/2019	E	7.6 ± 0.07	4.58 ± 4.99	5.14 ± *		35.26 ± 29.8	63.48 ± 26.33
	P					0.78 ± 1.13	1.15 ± *
	T	20.27 ± *	7.04 ± *	17.16 ± *	11.28 ± 10.6	26.89 ± *	7.99 ± 13.25
07/2019	E	8.67 ± 11.8	4.89 ± *	0.29 ± *	1.44 ± 1.23	1.98 ± 2.40	5.93 ± *
	P					6.32 ± *	4.28 ± *
	T	27.45 ± 1.96	198.7 ±191	34.66 ± 1.38	103.2 ± 17.6	119.71 ± 152	6.03 ± 2.13
11/2019	E			1.03 ± 0.92	1.76 ± 1.47	2.65 ± *	
	P				0.68 ± *		0.33 ± *
	T			1.93 ± *		9.93 ± 2.77	1.04 ± *
02/2020	E	1.33 ± *	0.36 ± *	30.67 ± 38.7	152.11 ± *	6.45 ± 2.05	76.46 ± 67.4
	P					26.58 ± *	
	T			17.32 ± 21.1	6.33 ± 4.36	13.83 ± 11.45	39.71 ± 49.90
07/2020	E	0.34 ± *	0.21 ± *	0.63 ± *	6.99 ± 8.74	5.46 ± *	17.62 ± *
	P					19.77 ± *	2.33 ± 3.08
	T		0.86 ± 0.72	4.18 ± 4.57		6.54 ± 4.51	18.46 ± 17.49

Table 28. Mean ± S.D. of Ephemeroptera, Plecoptera, and Trichoptera biomass (mg/m^2) across all dates and sites influenced by development and the mainstem land-use. Blanks indicate either no EPT taxa was collected during the sampling period or the EPT taxa collected was damaged and could not be measured for biomass analysis. **indicates there was no standard deviation as only one species was measured per the collected sample.*

		D2	D1	P1	R2	R1
07/2016	E				1.02 ± 0.68	2.76 ± 1.96
	P					
	T				7.03 ± 0.1	7.61 ± *
11/2016	E					5.71 ± *
	P				1.33 ± 0.23	1.35 ± *
	T				1.48 ± *	8.91 ± *
03/2017	E	4.92 ± *		3.58 ± *	10.85 ± 8.83	9.94 ± 6.77
	P					3.49 ± 3.9
	T	0.84 ± *			2.76 ± *	3.32 ± *
06/2017	E	7.85 ± *	0.17 ± 0.06	5.96 ± *		0.88 ± *
	P					
	T	7.92 ± 2.15	16.24 ± *	11.3 ± 7.5	4.82 ± *	2.03 ± *
10/2017	E		2.09 ± *		7.71 ± 4.92	3.41 ± *
	P					
	T	0.49 ± *	11.5 ± *		21.66 ± 29.6	
02/2018	E			2.07 ± 2.3	5.69 ± 7.4	6.31 ± *
	P			43.5 ± 41		
	T				4.75 ± 4.4	
08/2018	E		4.94 ± *		1.48 ± 1.41	0.46 ± *
	P		0.72 ± *			
	T		8.15 ± *		2.12 ± *	0.90 ±*
11/2018	E		4.35 ± *			
	P					
	T	214.13 ± 278	310.5 ± *	2.86 ± *		
02/2019	E		3.49 ± *			4.86 ± 2.74
	P					
	T	39.85 ± 31.9	101.45 ± *	4.98 ± *		
07/2019	E				17.35 ± *	11.90 ± 16.30
	P					
	T	21.72 ± 5.59	7.66 ± *	214.00 ± 104	54.54 ± 31.6	13.31 ± *
11/2019	E	2.11 ± *	1.41 ± 1.39		8.48 ± 12.67	46.7 ± 64.7
	P		0.84 ± *			
	T	3.57 ± 2.84	1.26 ± *		6.66 ± 6.67	5.66 ± 0.67
02/2020	E		1.92 ± 2.43		275.13 ± *	184.82 ± 314.2
	P					
	T	9.81 ± *	1.69 ± *	1.55 ± *	25.53 ± 6.85	12.55 ± 6.06
07/2020	E	1.79 ± 0.30	2.12 ± 2.47	5.42 ± *	24.44 ± *	18.56 ± 24.24
	P					
	T	23.67 ± 29.42	0.73 ± *	2.47 ± 0.3	2.06 ± *	2.59 ± 1.12

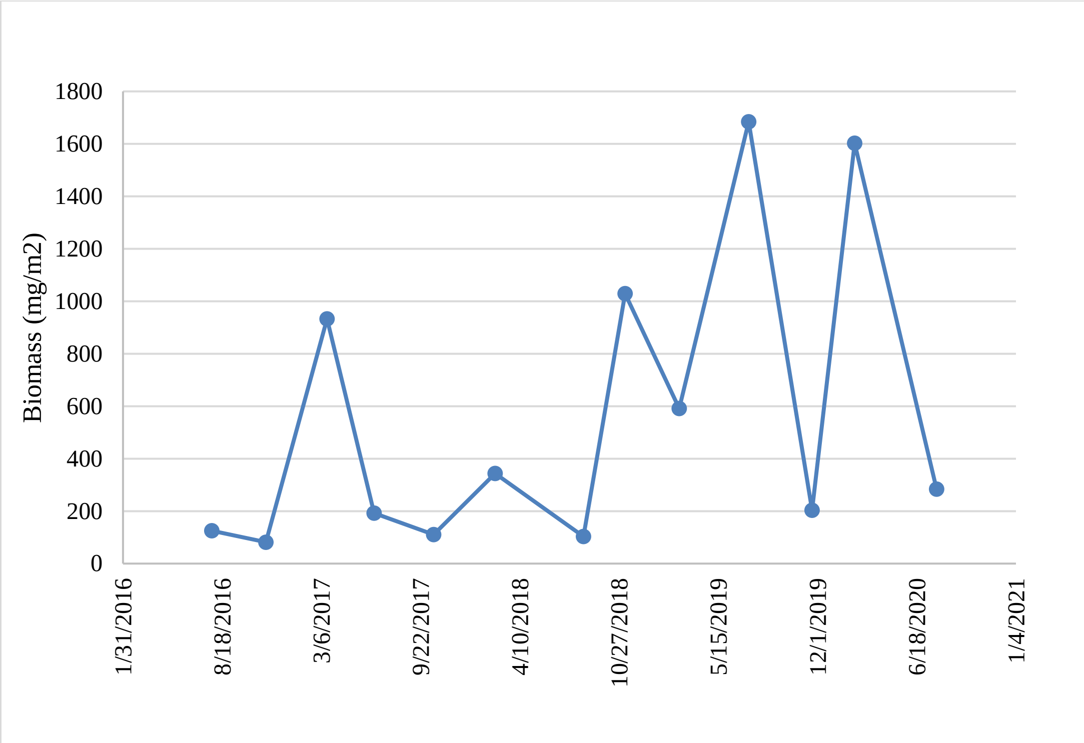

Figure 47. Total Biomass for all sites across all dates. Biomass of Ephemeroptera, Plecoptera, and Trichoptera taxa were included in the summation.

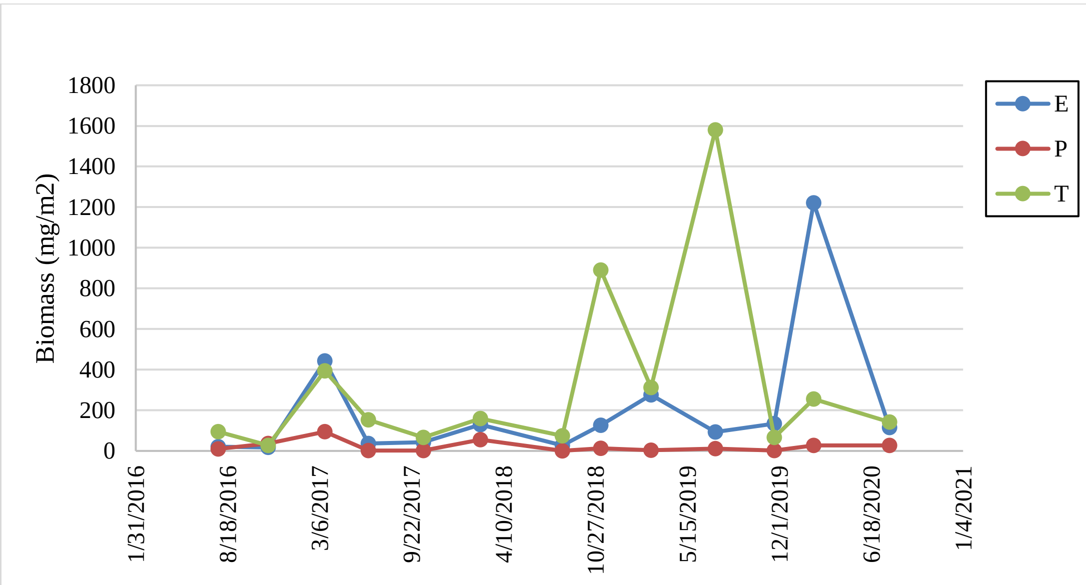

Figure 48. Total EPT Biomass across all sites and dates.

For site D2, the average Trichoptera biomass increased from 5.73 (mg/m^2) to 103.21 (mg/m^2) post-restoration while the average Ephemeroptera biomass decreased from 6.39 (mg/m^2) to 2.85 (mg/m^2) post-restoration. There were no Plecoptera taxa present before or after restoration (Table 28). For site D1, the average Trichoptera biomass increased from 13.87 (mg/m^2) to 70.63 (mg/m^2) post-restoration. The average Ephemeroptera biomass increased from 1.22 (mg/m^2) to 4.28 (mg/m^2) post-restoration. There was no Plecoptera taxa present before or after restoration (Table 28).

For sites D2 and D1, the majority of the biomass before and after restoration was accounted for by Trichoptera taxa and Ephemeroptera taxa (Figure 49, Figure 50). For D2, the average of the combined EPT biomass increased from 9.98 (mg/m^2) pre-restoration to 104.16 (mg/m^2) post-restoration (Figure 51). For D1, the average of the combined EPT biomass increased from 15.01 (mg/m^2) pre-restoration to 75.18 (mg/m^2) post-restoration (Figure 51). However, there was no significant difference in EPT biomass before or after restoration (Table 34).

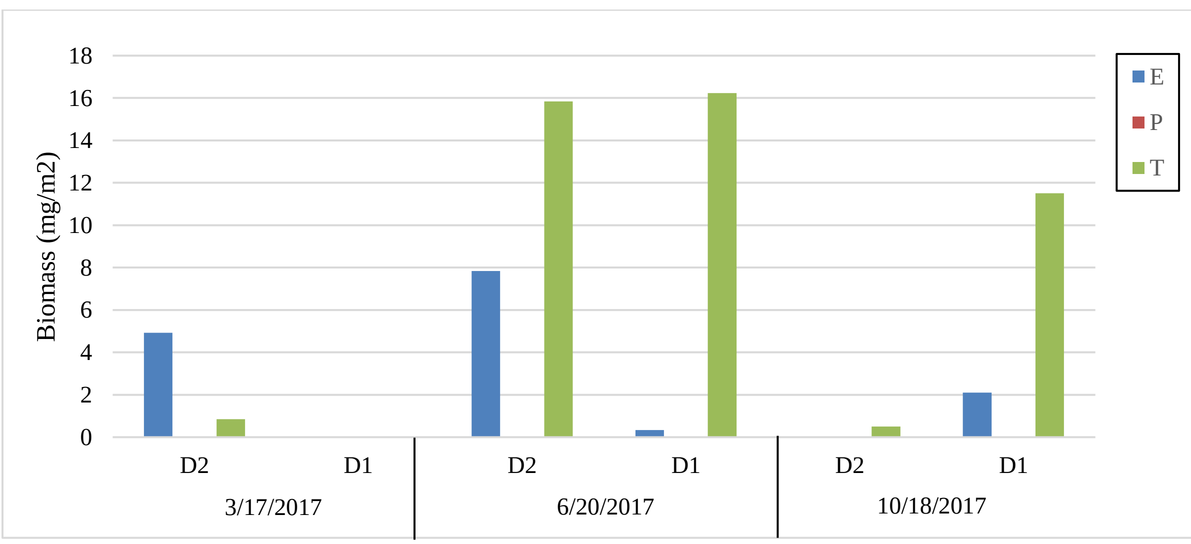

Figure 49. EPT biomass for the development influence sub-watershed pre-restoration.

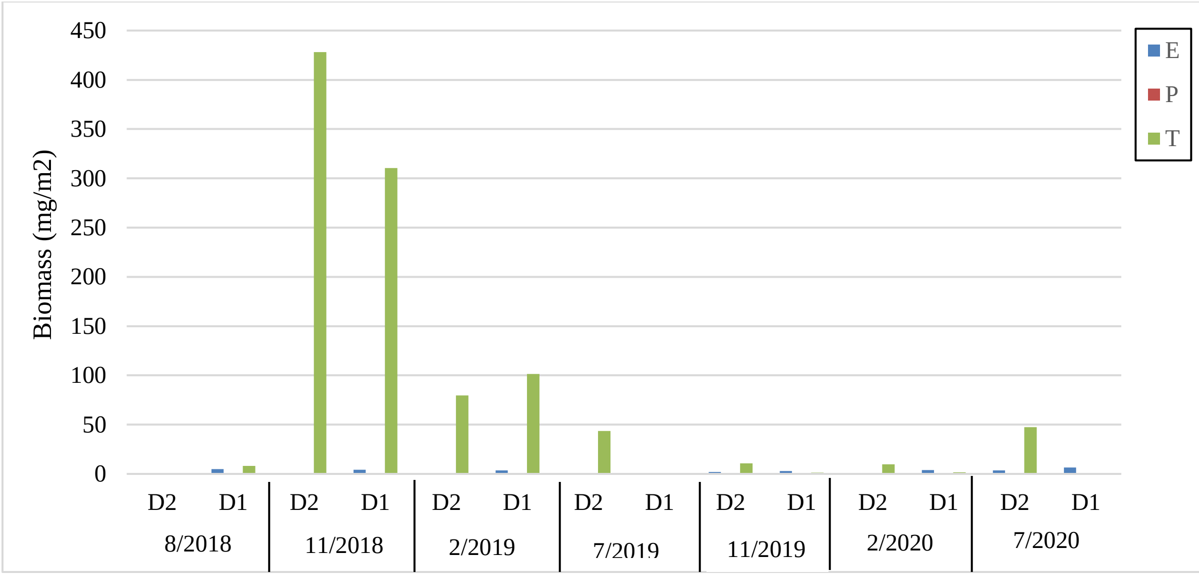

Figure 50. EPT biomass for the development influence sub-watershed post-restoration.

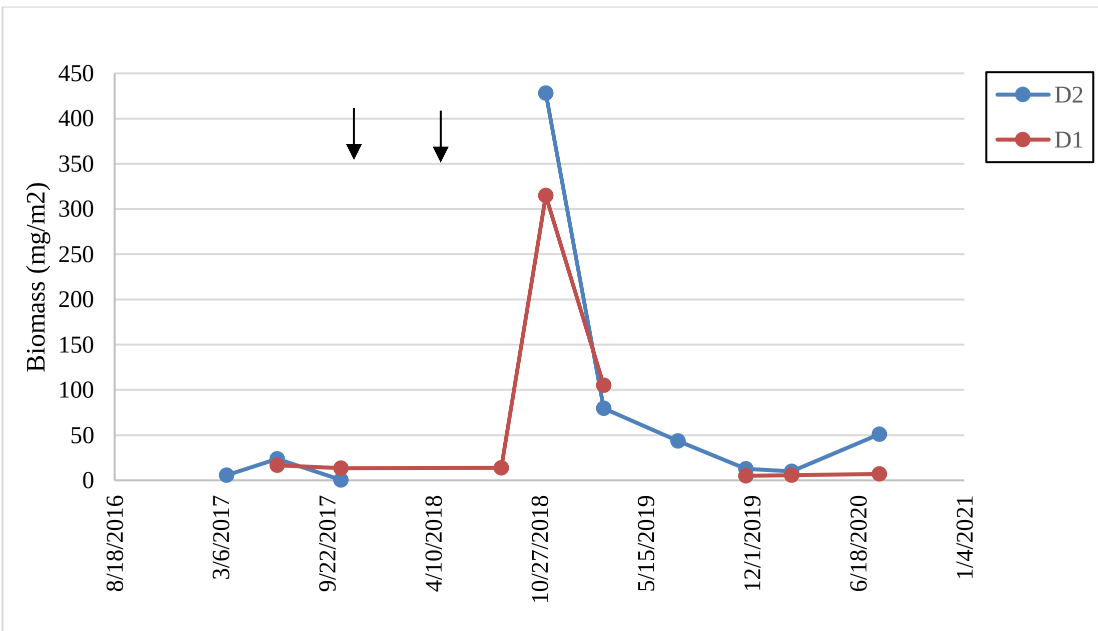

Figure 51. Total EPT biomass for the development influence sub-watershed from 2016-2020. Black arrows represent the start and end date of restoration construction, respectively.

For site C2, the average Trichoptera biomass increased from 36.48 (mg/m^2) to 44.11 (mg/m^2) post-restoration. The average Ephemeroptera biomass increased from 15.9 (mg/m^2) to 46.48 (mg/m^2) post-restoration. The average Plecoptera biomass decreased from 11.34 (mg/m^2) pre-restoration to 5.09 (mg/m^2) post-restoration (Table 27). For C1, the average Trichoptera biomass increased from 44.69 (mg/m^2) to 68.51 (mg/m^2) post-restoration. The average Ephemeroptera biomass increased from 7.77 (mg/m^2) to 39.86 (mg/m^2) post-restoration. The average Plecoptera biomass increased from 0.78 (mg/m^2) pre-restoration to 13.75 (mg/m^2) post-restoration (Table 27).

For C2, Trichoptera biomass was greater pre-restoration and Ephemeroptera biomass was greater post-restoration (Figure 52, Figure 53). For C1, Trichoptera biomass was the greatest before and after restoration. For C2, the average of the combined EPT biomass increased from 63.73 (mg/m^2) pre-restoration to 94.24 (mg/m^2) post-restoration (Figure 54). For C1, the average of the combined EPT biomass increased from 50.39 (mg/m^2) pre-restoration to 117.55 (mg/m^2) post-restoration (Figure 54). However, there was no significant difference in EPT biomass before or after restoration (Table 35).

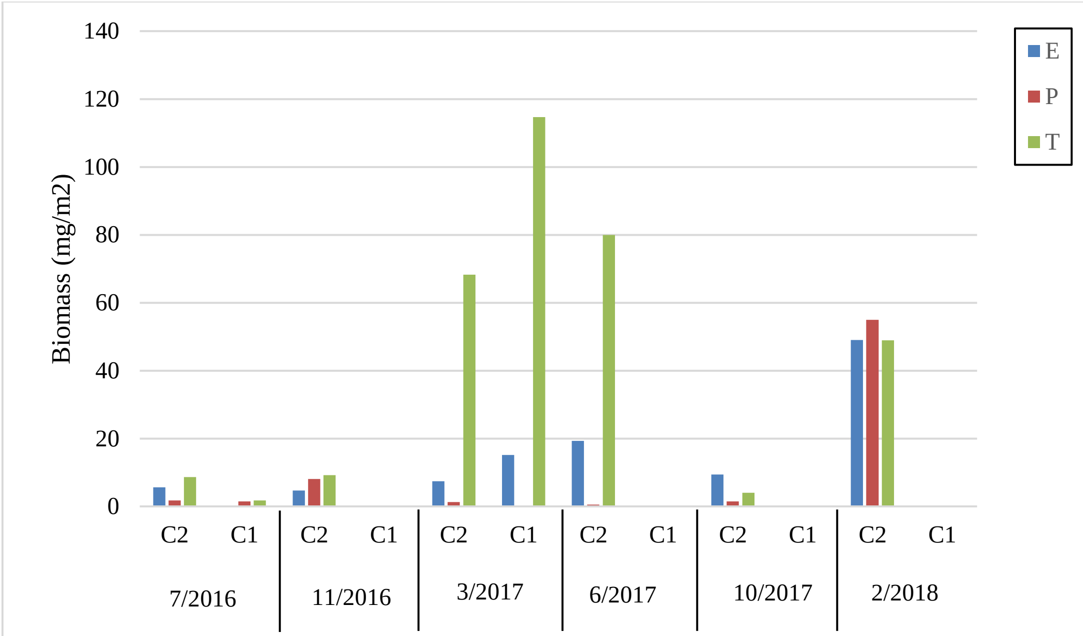

Figure 52. EPT biomass for the forested control influence sub-watershed pre-restoration. **Note C2 was not restored.*

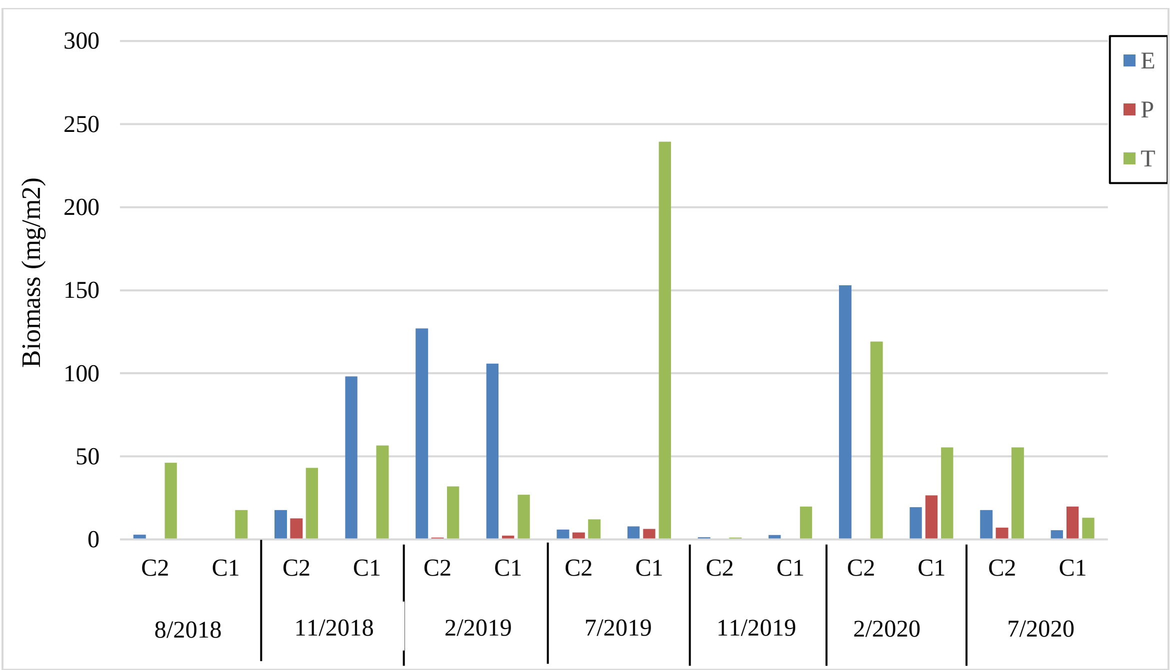

Figure 53. EPT biomass for the forested control influence sub-watershed post-restoration. **Note C2 was not restored.*

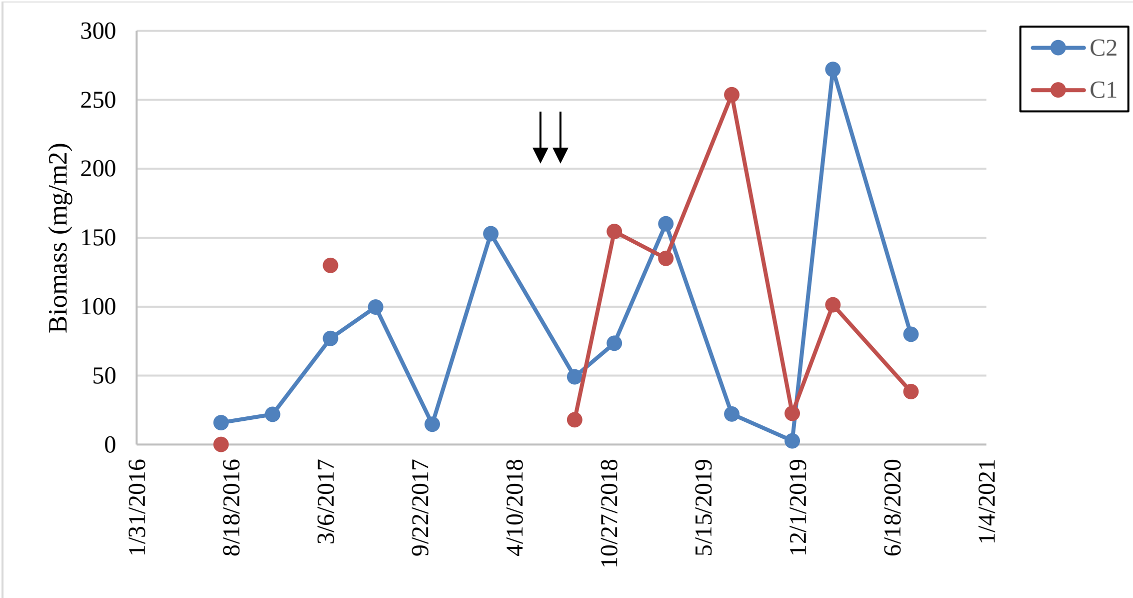

Figure 54. Total EPT biomass for the forested control influence sub-watershed from 2016-2020. Black arrows represent the start and end date of restoration construction respectively for the C1 site. **Note C2 was not restored.*

For site P1, the average Trichoptera biomass increased from 54.83 (mg/m^2) to 88.35 (mg/m^2) post-restoration. The average Ephemeroptera biomass increased from 4.56 (mg/m^2) to 5.42 (mg/m^2) post-restoration. There was no Plecoptera taxa present before or after restoration (Table 28). Most of the biomass before and after restoration was accounted by Trichoptera taxa, Ephemeroptera taxa, and Plecoptera taxa respectively (Figure 55, Figure 56). The average of the combined EPT biomass increased from 41.12 (mg/m^2) pre-restoration to 89.35 (mg/m^2) post-restoration (Figure 57). However, there was no significant difference in EPT biomass before or after restoration (Table 34).

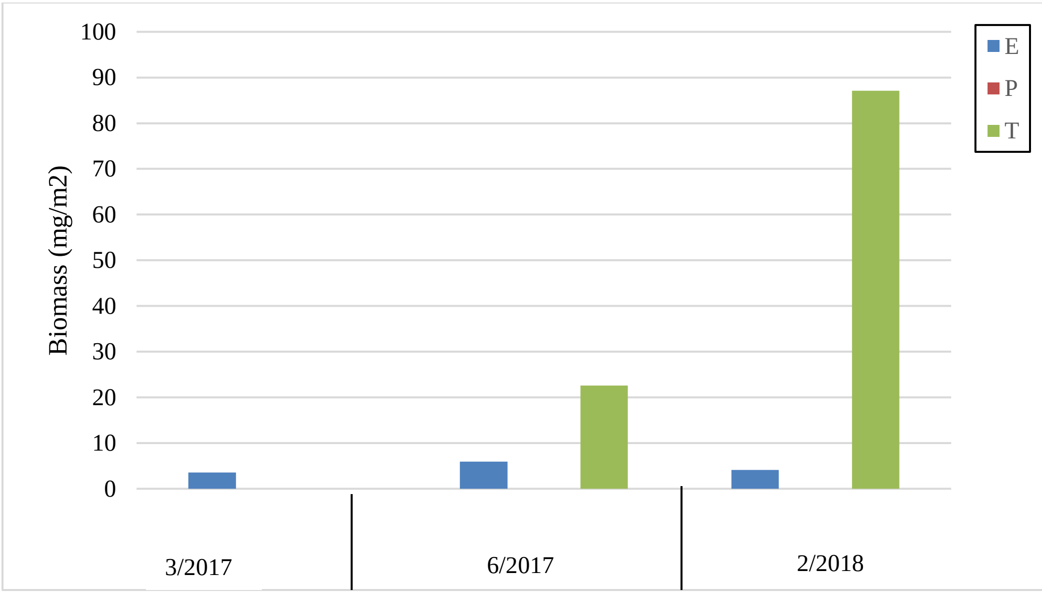

Figure 55. EPT biomass for site P1, the pond influence sub-watershed pre-restoration.

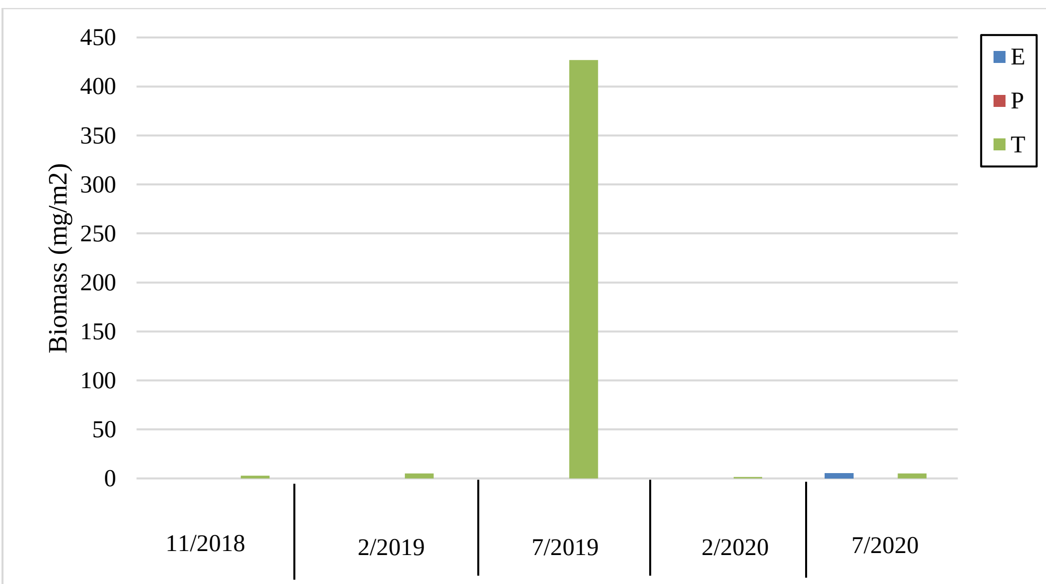

Figure 56. EPT biomass for site P1, the pond influence sub-watershed post-restoration.

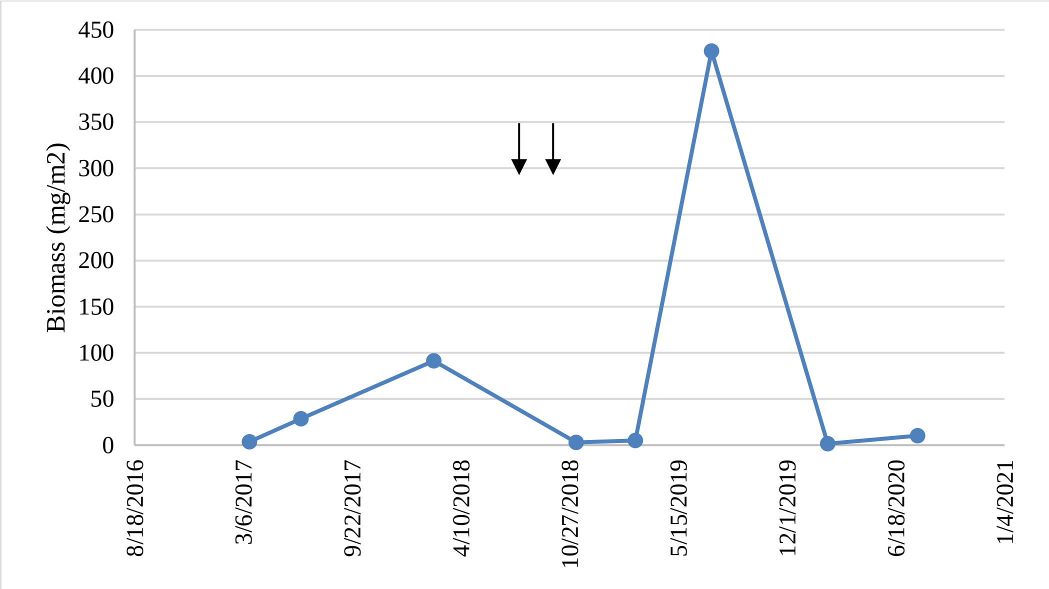

Figure 57. Total EPT biomass for site P1, the pond influence sub-watershed from 2016-2020. Black arrows represent the start and end date of restoration construction respectively.

For site A4, the average Trichoptera biomass increased from 10.93 (mg/m^2) to 26.23 (mg/m^2) post-restoration. The average Ephemeroptera biomass increased from 3.03 (mg/m^2) to 6.51 (mg/m^2) post-restoration. The average Plecoptera biomass decreased from 5.34 (mg/m^2) pre-restoration to 0.00 (mg/m^2) post-restoration (Table 27). For site A3, the average Trichoptera biomass increased from 16.74 (mg/m^2) to 101.77 (mg/m^2) post-restoration. The average Ephemeroptera biomass decreased from 17.37 (mg/m^2) to 5.81 (mg/m^2) post-restoration. The average Plecoptera biomass decreased from 2.38 (mg/m^2) pre-restoration to 0.00 (mg/m^2) post-restoration (Table 27). For site A2, the average Trichoptera biomass decreased from 43.91 (mg/m^2) to 23.11 (mg/m^2) post-restoration. The average Ephemeroptera biomass increased from 3.80 (mg/m^2) to 11.87 (mg/m^2) post-restoration. The average Plecoptera biomass decreased from 7.29 (mg/m^2) pre-restoration to 0.00 (mg/m^2) post-restoration (Table 27). For site A1, the average Trichoptera biomass increased from 11.00 (mg/m^2) to 57.29 (mg/m^2) post-restoration.

The average Ephemeroptera biomass decreased from 69.80 (mg/m^2) to 35.49 (mg/m^2) post-restoration. The average Plecoptera biomass decreased from 69.63 (mg/m^2) pre-restoration to 0.00 (mg/m^2) post-restoration (Table 27).

Across the agricultural sub-watershed, Ephemeroptera biomass was greater pre-restoration and Trichoptera biomass was greater post-restoration (Figure 58, Figure 59). For site A4, the average of the combined EPT biomass increased from 11.49 (mg/m^2) pre-restoration to 19.62 (mg/m^2) post-restoration (Figure 60). For site A3, the average of the combined EPT biomass increased from 29.19 (mg/m^2) pre-restoration to 72.69 (mg/m^2) post-restoration (Figure 60). For site A2, the average of the combined EPT biomass decreased from 42.20 (mg/m^2) pre-restoration to 34.97 (mg/m^2) post-restoration (Figure 60). For site A1, the average of the combined EPT biomass decreased from 80.63 (mg/m^2) pre-restoration to 77.32 (mg/m^2) post-restoration (Figure 60). However, there was no significant difference in EPT biomass before and after restoration (Table 34).

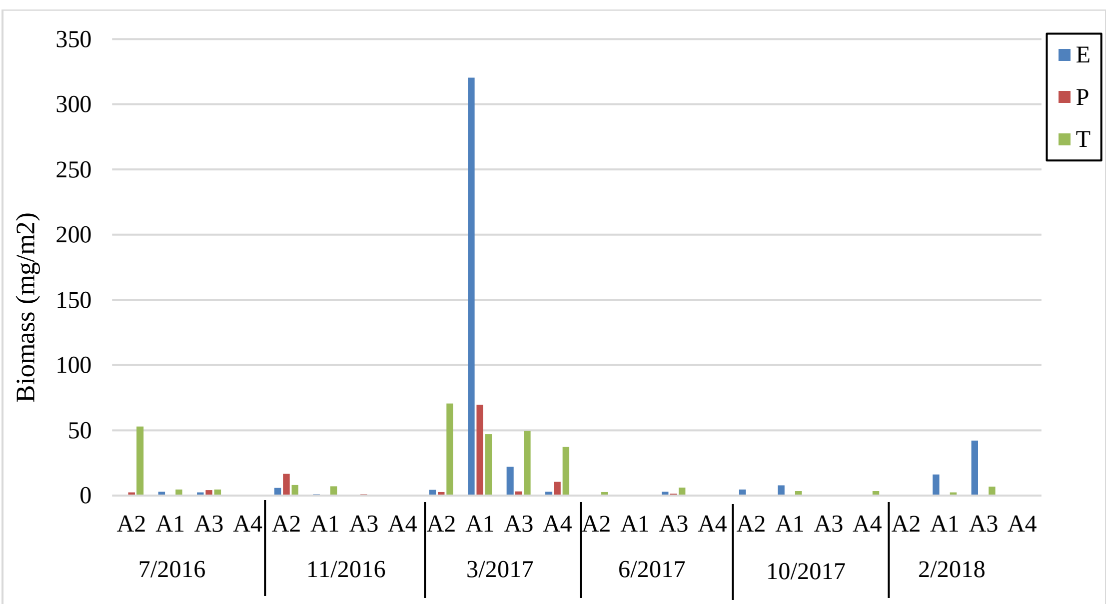

Figure 58. EPT biomass for the historically agricultural influence sub-watershed pre-restoration.

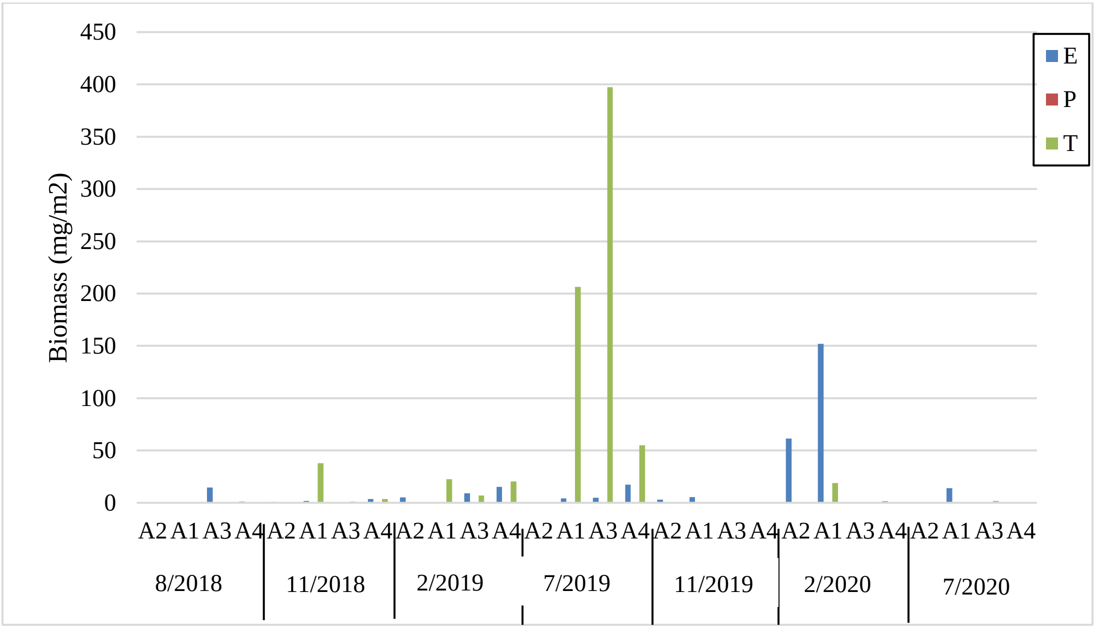

Figure 59. EPT biomass for the historically agricultural influence sub-watershed post-restoration.

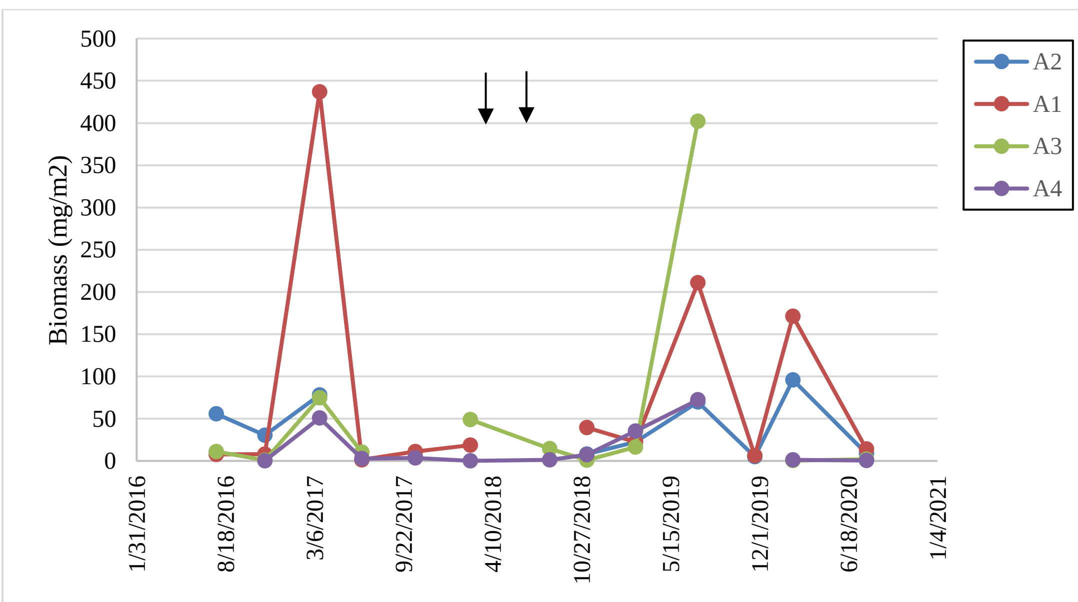

Figure 60. Total EPT biomass for the historically agricultural influence sub-watershed from 2016-2020. Black arrows represent the start and end date of restoration construction respectively.

For site R2, the average Trichoptera biomass increased from 21.41 (mg/m^2) to 51.92 (mg/m^2) post-restoration. The average Ephemeroptera biomass increased from 12.87 (mg/m^2) to 85.59 (mg/m^2) post-restoration. The average Plecoptera biomass decreased from 2.66 (mg/m^2) to 0.00 (mg/m^2) post-restoration (Table 28). For site R1, the average Trichoptera biomass increased from 4.96 (mg/m^2) to 17.51 (mg/m^2) post-restoration. The average Ephemeroptera biomass increased from 7.84 (mg/m^2) to 146.13 (mg/m^2) post-restoration. The average Plecoptera biomass decreased from 4.16 (mg/m^2) to 0.00 (mg/m^2) post-restoration (Table 28).

For R2, the average of the combined EPT biomass increased from 21.41 (mg/m^2) pre-restoration to 137.51 (mg/m^2) post-restoration (Figure 63). For R1, the average of the combined EPT biomass increased from 12.57 (mg/m^2) pre-restoration to 160.14 (mg/m^2) post-restoration (Figure 63). After restoration, Ephemeroptera biomass significantly increased (Figure 64, Table 34, T-test, p=0.005, α=0.05)). Across the sub-watershed, there was no Plecoptera taxa present after restoration (Figure 61, 62).

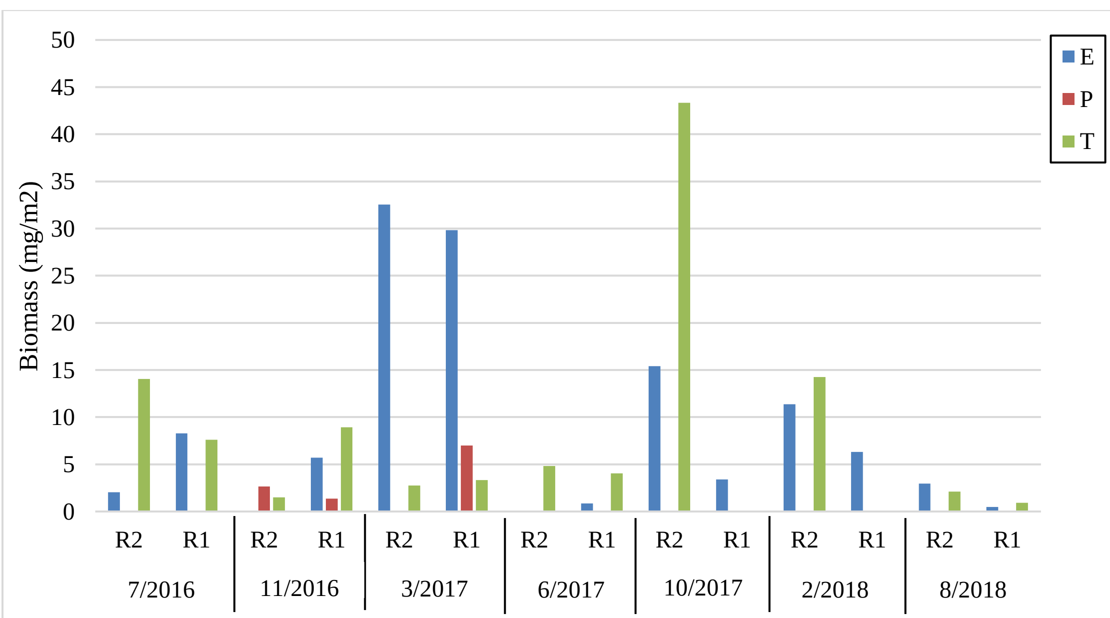

Figure 61. EPT biomass for the Reedy influence sub-watershed pre-restoration.

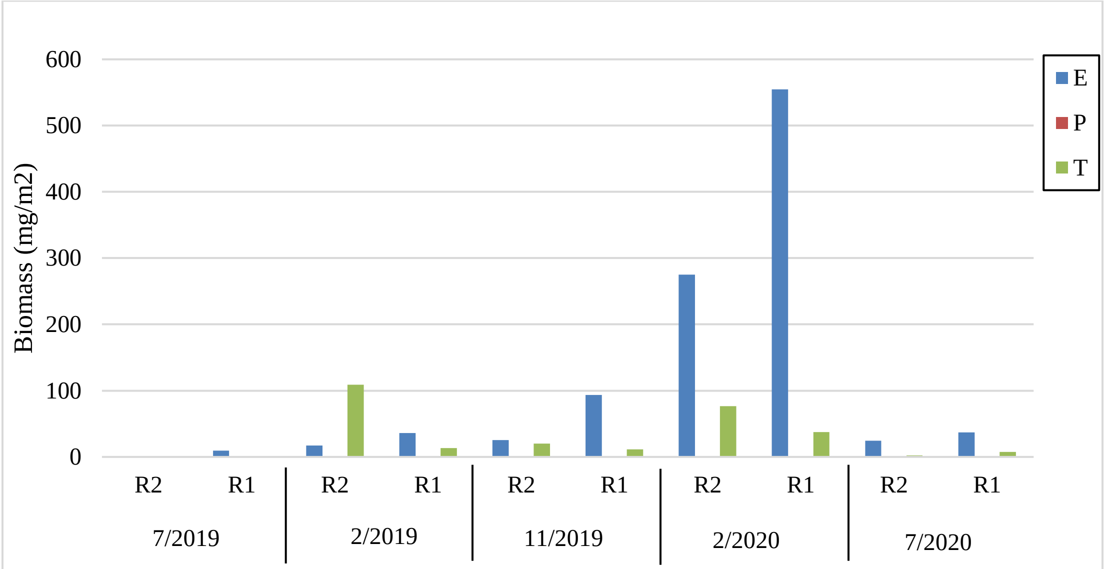

Figure 62. EPT biomass for the Reedy influence sub-watershed post-restoration.

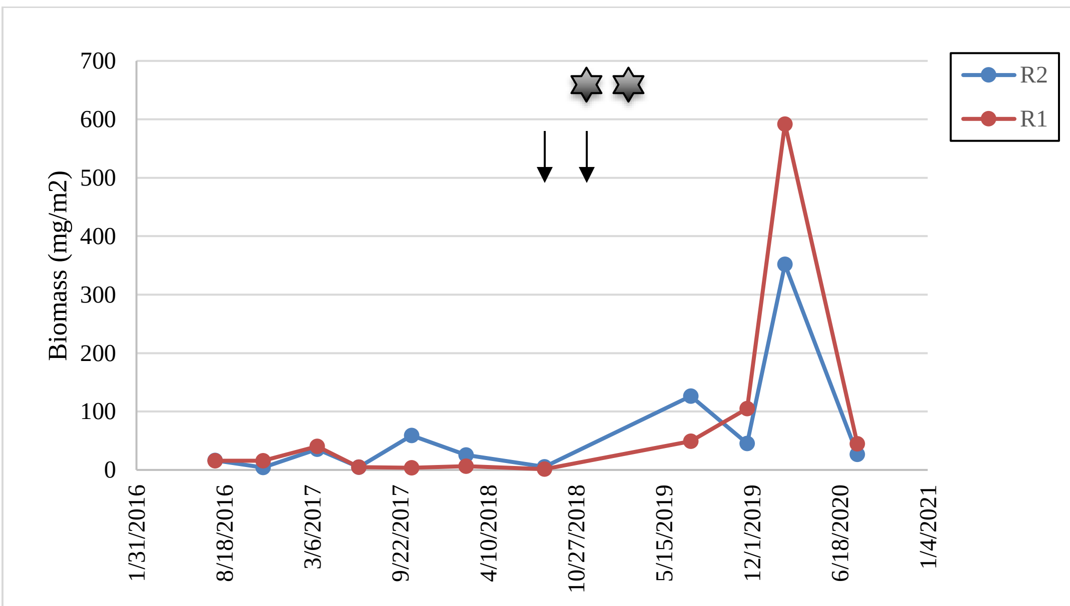

Figure 63. Total EPT biomass for the Reedy influence (mainstem) sub-watershed from 2016-2020. Black arrows represent the start and end date of restoration construction respectively for site R2. Black stars represent the start and end data of restoration construction respectively for site R1.

Table 29. p-values obtained from running a two-sample t-test assuming unequal variances on the difference between the average Ephemeroptera biomass (mg/m2) pre-restoration and post-restoration for all 11 surface water sites. Blanks indicates there was not enough replicates to perform a t-test. **Indicates significant differences.*

SEASON	**SITE**								
	D2	**D1**	**P1**	**A4**	**A3**	**A2**	**A1**	**R2**	**R1**
ALL	0.276	0.094			0.325	0.457	0.639	0.335	0.251
WINTER					0.243	0.459	0.642	0.492	0.349
SUMMER		0.059			0.450	0.546	0.611	0.089	***0.000^{-5}****

Table 30. *p*-values obtained from running a two-sample t-test assuming unequal variances on the difference between the average Ephemeroptera biomass (mg/m2) post-restoration between sites C2 and C1. Blanks indicates there was not enough replicates to perform a t-test. **Indicates significant differences.*

SEASON	**C2/C1 POST**
ALL	0.692
WINTER	0.710
SUMMER	0.461

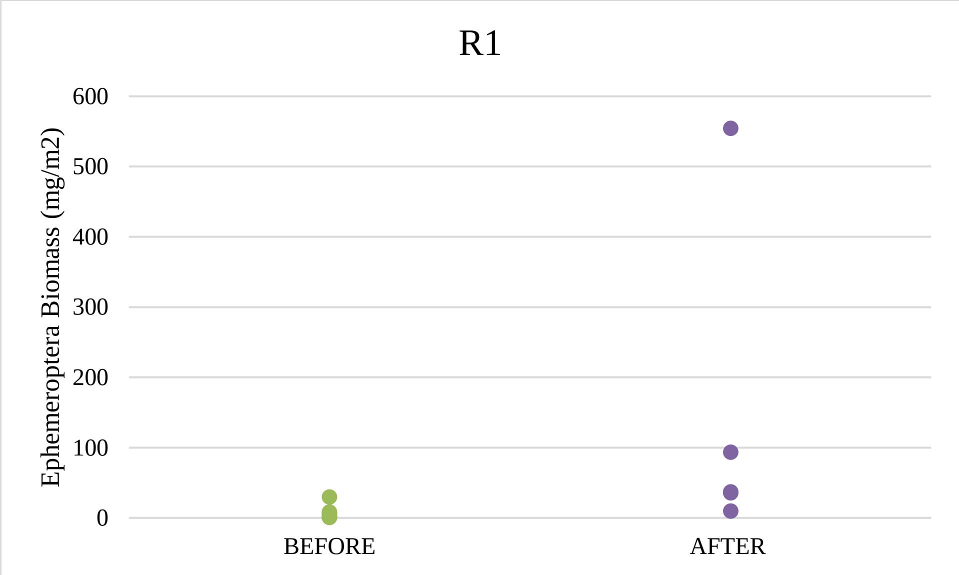

Figure 64. Dot plot showing significant difference in the average Ephemeroptera biomass (mg/m2) at site R1 in the summer before and after restoration (p=0.000^{-5}, α=0.05).

Table 31. *p*-values obtained from running a two-sample t-test assuming unequal variances on the difference between the average Plecoptera biomass (mg/m2) post-restoration between sites C2 and C1. Blanks indicates there was not enough replicates to perform a t-test. **Indicates significant differences.*

SEASON	**C2/C1 POST**
ALL	0.229
WINTER	0.586
SUMMER	0.476

Table 32. *p*-values obtained from running a two-sample t-test assuming unequal variances on the difference between the average Trichoptera biomass (mg/m2) pre-restoration and post-restoration for all 11 surface water sites. Blanks indicates there was not enough replicates to perform a t-test. **Indicates significant differences.*

SEASON	**SITE**								
	D2	**D1**	**P1**	**A4**	**A3**	**A2**	**A1**	**R2**	**R1**
ALL	0.200	0.288	0.727	0.447	0.454	0.755	0.295	0.213	0.169
WINTER				0.792	0.463	0.591	0.948	0.379	0.402
SUMMER	0.133	0.165			0.506			0.599	0.201

Table 33. *p*-values obtained from running a two-sample t-test assuming unequal variances on the difference between the average Trichoptera biomass (mg/m2) post-restoration between sites C2 and C1. Blanks indicates there was not enough replicates to perform a t-test. **Indicates significant differences.*

SEASON	**C2/C1 POST**
ALL	0.623
WINTER	0.751
SUMMER	0.563

Table 34. *p*-values obtained from running a two-sample t-test assuming unequal variances on the difference between the average EPT total biomass (mg/m2) pre-restoration and post-restoration for all 11 surface water sites. Blanks indicates there was not enough replicates to perform a t-test. **Indicates significant differences.*

SEASON	**SITE**								
	D2	**D1**	**P1**	**A4**	**A3**	**A2**	**A1**	**R2**	**R1**
ALL	0.213	0.288	0.609	0.611	0.547	0.755	0.968	0.219	0.248
WINTER			0.497	0.909	0.249	0.550	0.583	0.455	0.357
SUMMER	0.213	0.426		0.461	0.430	0.839	0.477	0.478	***0.0005****

Table 35. *p*-values obtained from running a two-sample t-test assuming unequal variances on the difference between the average EPT total biomass (mg/m2) post-restoration between sites C2 and C1. Blanks indicates there was not enough replicates to perform a t-test. **Indicates significant differences.*

SEASON	C2/C1 POST
ALL	0.658
WINTER	0.961
SUMMER	0.564

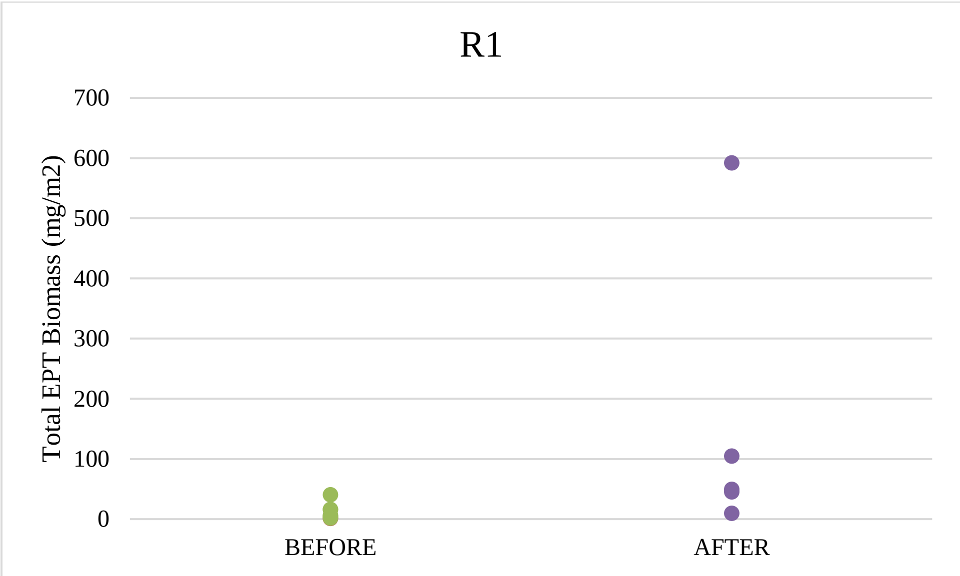

Figure 65. Dot plot showing significant differences in the average Ephemeroptera biomass at site R1 in the summer before and after restoration (p=0.000^{-5}, α=0.05).

7.1.7: Cumulative Taxa

Across all sub-watersheds, cumulative taxa hit a plateau around the beginning of restoration and increased slightly after restoration. For D2, the cumulative taxa reached 53 on 11/08/2018 and reached 59 from the last sampling event (Figure 66). For D1, the cumulative taxa reached 45 on 08/16/2018 and reached 54 from the last sampling event (Figure 66). For C2, the cumulative taxa reached 60 on 08/16/2018 and reached 66 from the last sampling event (Figure 67). For C1, the cumulative taxa reached 39 on 08/16/2018 and reached 55 from the last sampling event (Figure 67). For P1, the cumulative taxa reached 49 on 11/08/2018 and reached 52 from the last sampling event

(Figure 68). For A4, the cumulative taxa reached 60 on 08/16/2018 and reached 66 on the last sampling event (Figure 69). For A3, the cumulative taxa reached 80 on 08/16/2018 and then reached 84 on the last sampling event (Figure 69). For A2, the cumulative taxa reached 77 on 08/16/2018 and then reached 83 on the last sampling event (Figure 69). For A1, the cumulative taxa reached 75 on 08/16/2018 and then reached 81 on the last sampling event (Figure 69). For R2, the cumulative taxa on 02/25/2019 and then reached 59 on the last sampling event (Figure 70). For R1, the cumulative taxa reached 57 on 02/25/2019 and then reached 60 on the last sampling event (Figure 70).

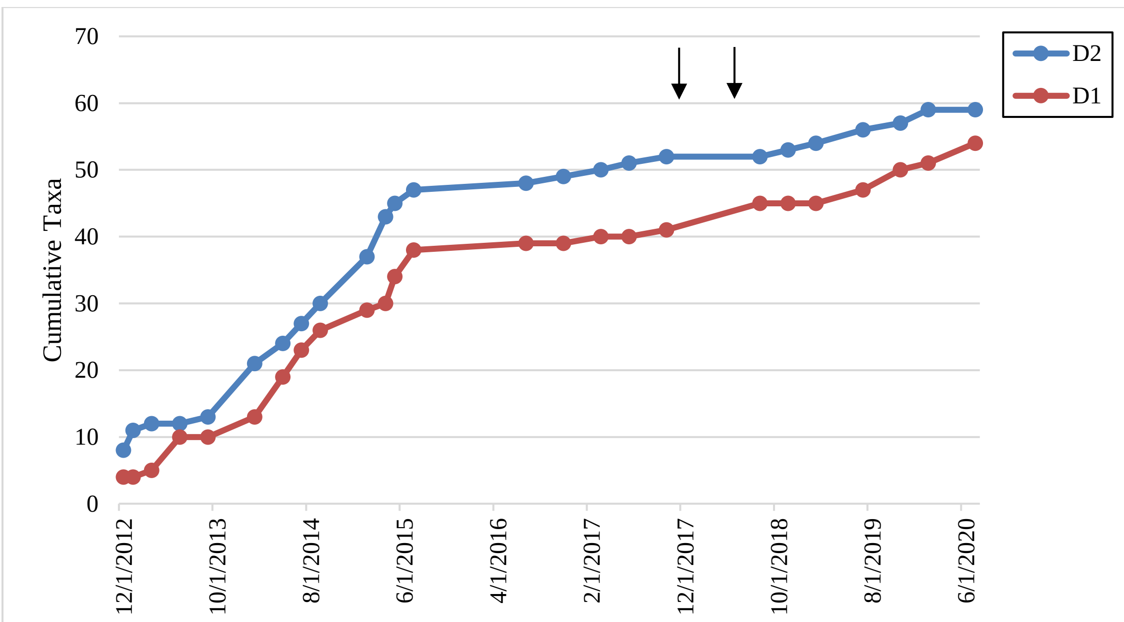

Figure 66. Cumulative taxa for the development influence sub-watershed from 2012-2020. Black arrows represent the start and end date of restoration construction, respectively.

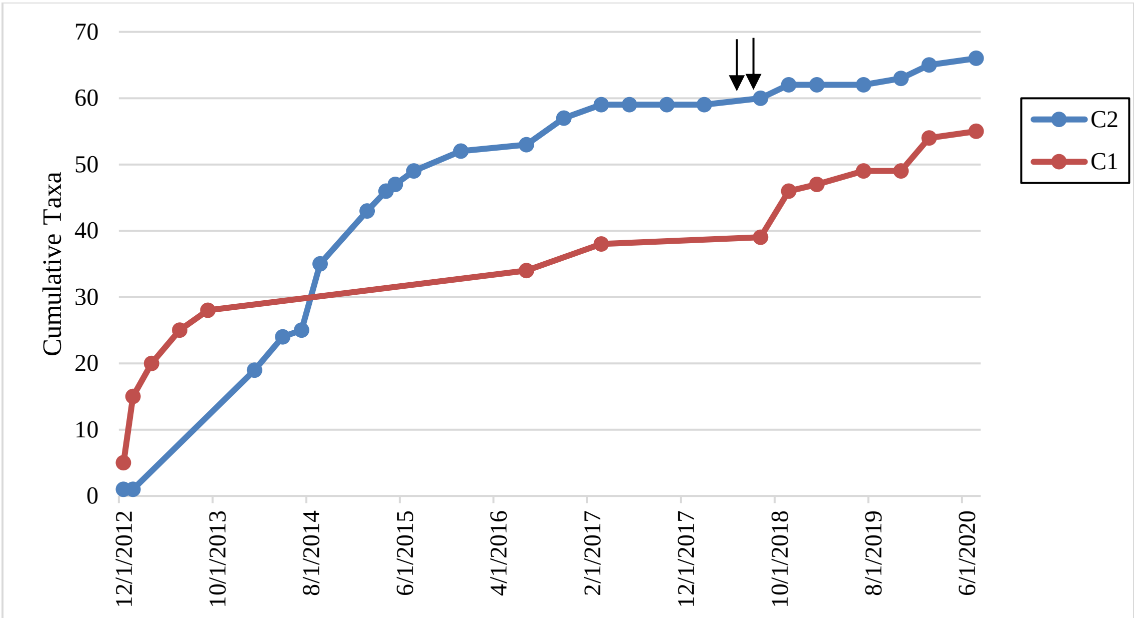

Figure 67. Cumulative taxa for the forested control sub-watershed from 2012-2020. Black arrows represent the start and end date of restoration construction respectively for C1. **Note: C2 was not restored.*

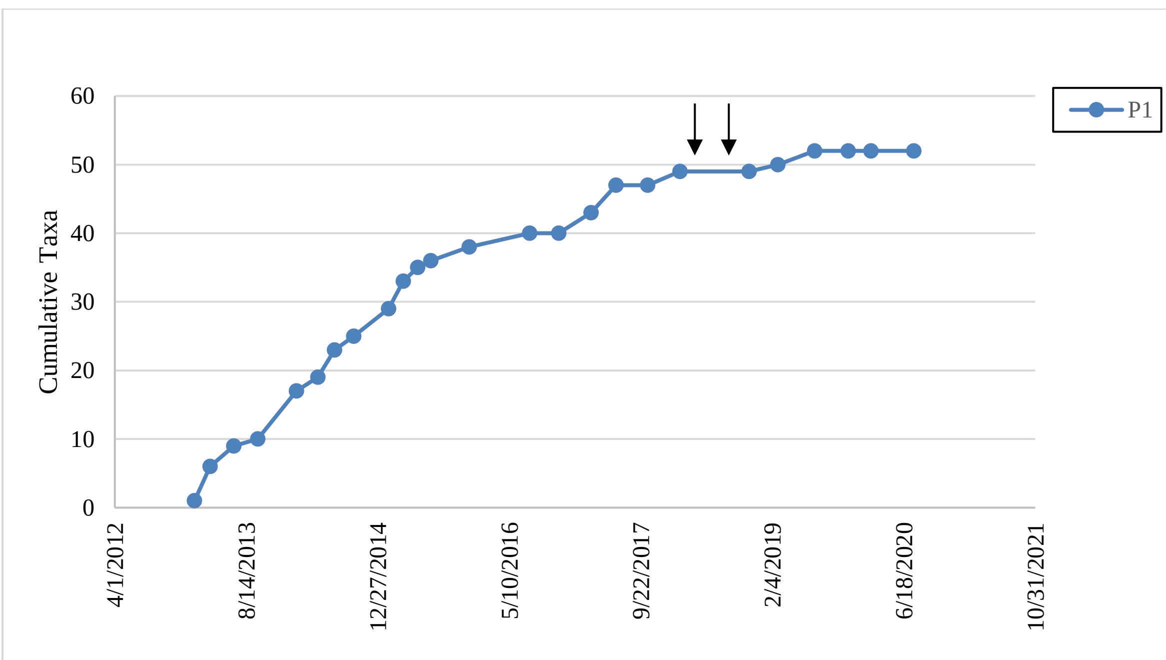

Figure 68. Cumulative taxa for the pond influence sub-watershed from 2012-2020. Black arrows represent the start and end date of restoration construction, respectively.

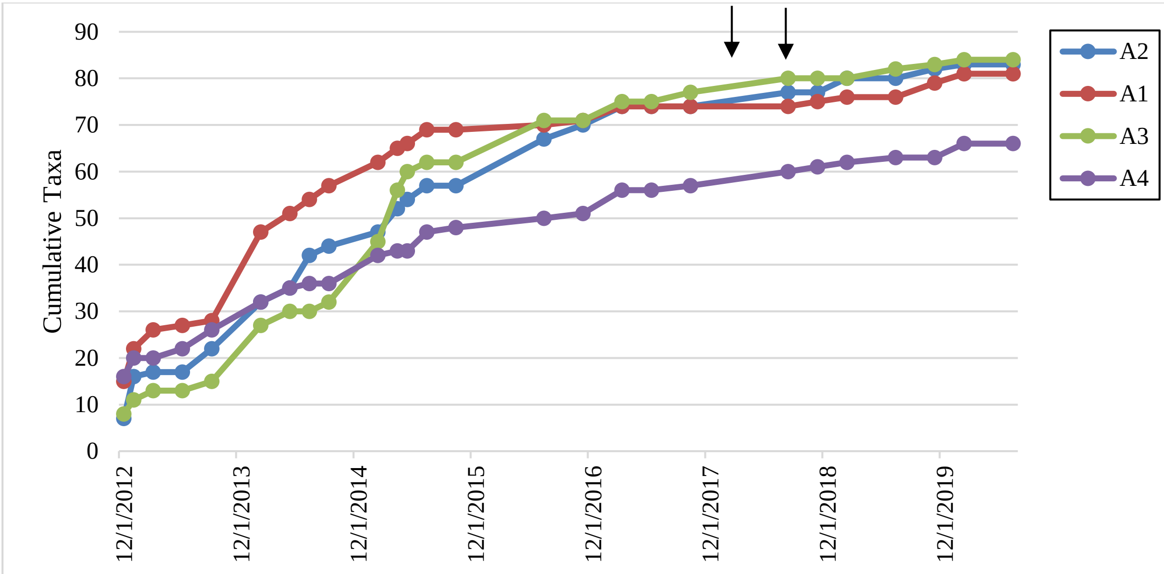

Figure 69. Cumulative taxa for the agricultural influence sub-watershed from 2012-2020. Black arrows represent the start and end date of restoration construction, respectively.

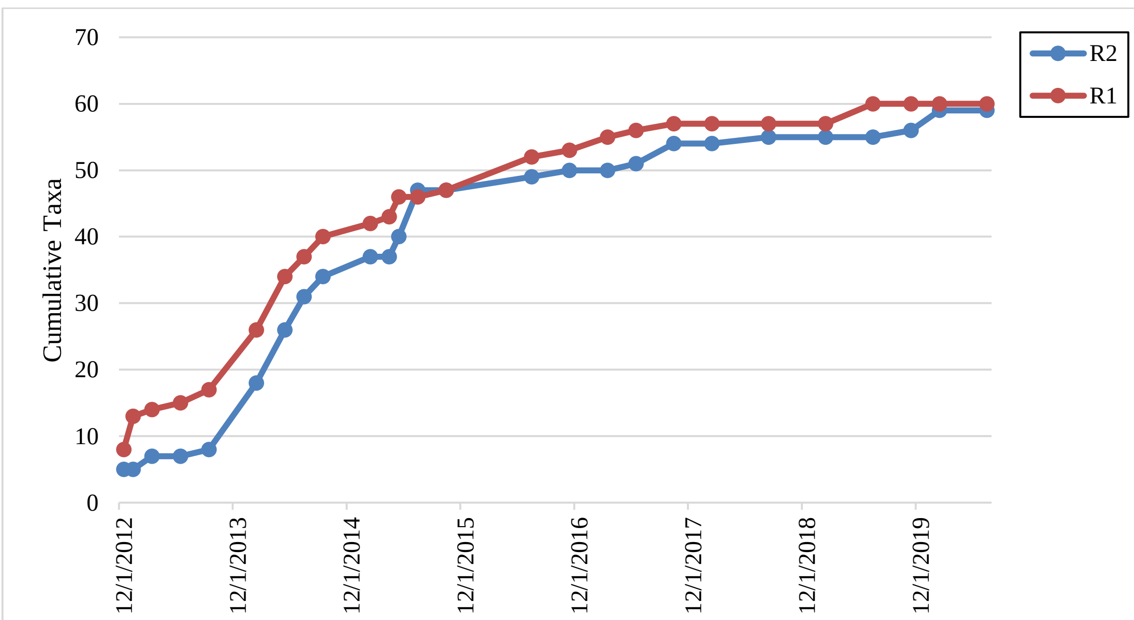

Figure 70. Cumulative taxa for the Reedy influence (mainstem) sub-watershed from 2012-2020. Black arrows represent the start and end date of restoration construction respectively for site R2. Black stars represent the start and end data of restoration construction respectively for site R1.

7.2: Water Chemistry

7.2.1: Temperature

For site D2, the temperature in the summer was between 22.5 ^{o}C to 25.8 ^{o}C and in the winter was between 9.4 ^{o}C to 10.6 ^{o}C before restoration and after restoration the temperature in the summer was between 23.8 ^{o}C to 24.8 ^{o}C and in the winter was between 7.2 ^{o}C to 11.0 ^{o}C (Table 36). For site D1, the temperature in the summer was between 21.2 ^{o}C to 26.7 ^{o}C and in the winter was between 8.4 ^{o}C to 11.3 ^{o}C before restoration and after restoration the temperature in the summer was between 25.1 ^{o}C to 30.3 ^{o}C and in the winter was between 6.8 ^{o}C to 12.6 ^{o}C (Table 36). Sites D2 and D1 follow the same seasonal patterns with temperature rising in the summer and falling in the winter with trends showing temperature has increased slightly after restoration (Figure 71).

For C2, the temperature in the summer was between 19.5 ^{o}C to 24.7 ^{o}C and in the winter was between 8.8 ^{o}C to 11.7 ^{o}C before restoration and after restoration the temperature in the summer was between 22.1 ^{o}C to 23.0 ^{o}C and in the winter was between 9.3 ^{o}C to 12.5 ^{o}C (Table 36). For C1, the temperature in the summer was between 19.8 ^{o}C to 26.2 ^{o}C and in the winter was between 8.2 ^{o}C to 11.9 ^{o}C before restoration and after restoration the temperature in the summer was between 22.9 ^{o}C to 23.7 ^{o}C and in the winter was between 8.8 ^{o}C to 12.9 ^{o}C (Table 36). Sites D2 and D1 follow the same seasonal patterns with temperature rising in the summer and falling in the winter with trends showing temperature has increased slightly after restoration (Figure 72).

For P1, the temperature in the summer was between 12.5 ^oC to 24.6 ^oC and in the winter was between 9.4 ^oC to 13.1 ^oC before restoration and after restoration the temperature in the summer was between 27.1 ^oC to 28.6 ^oC and in the winter was between 9.3 ^oC to 12.5 ^oC (Table 36). For P1, temperature rises in the summer and falls in the winter with trends showing temperature has increased slightly after restoration (Figure 73).

For site A4, the temperature in the summer was between 20.7 ^oC to 21.6 ^oC and in the winter was between 4.2 ^oC to 10.7 ^oC before restoration and after restoration the temperature in the summer was between 23.8 ^oC to 25.2 ^oC and in the winter was between 6.2 ^oC to 9.4 ^oC (Table 36). For site A3, the temperature in the summer was between 18.5 ^oC to 21.0 ^oC and in the winter was between 4.0 ^oC to 10.8 ^oC before restoration and after restoration the temperature in the summer was between 23.9 ^oC to 25.1 ^oC and in the winter was between 6.7 ^oC to 12.2 ^oC (Table 36). For site A2, the temperature in the summer was between 20.4 ^oC to 23.6 ^oC and in the winter was between 4.6 ^oC to 9.7 ^oC before restoration and after restoration the temperature in the summer was between 24.3 ^oC to 25.8 ^oC and in the winter was between 7.1 ^oC to 17. ^oC (Table 36). For site A1, the temperature in the summer was between 20.7 ^oC to 21.6 ^oC and in the winter was between 4.2 ^oC to 8.5 ^oC before restoration and after restoration the temperature in the summer was between 23.8 ^oC to 25.2 ^oC and in the winter was between 6.2 ^oC to 9.4 ^oC (Table 36). Sites A4, A3, A2, and A1 and D1 follow the same seasonal patterns with temperature rising in the summer and falling in the winter with trends showing temperature has increased slightly after restoration (Figure 74).

For site R2, the temperature in the summer was between 21.0 °C to 23.3 °C and in the winter was between 2.6 °C to 9.3 °C before restoration and after restoration the temperature in the summer was between 26.7 °C to 29.7 °C and in the winter was between 10.0 °C to 12.6 °C (Table 36). For site R1, the temperature in the summer was between 21.4 °C to 24.5 °C and in the winter was between 6.6 °C to 11.6 °C before restoration and after restoration the temperature in the summer was between 26.9 °C to 27.8 °C and in the winter was between 10.0 °C to 12.6 °C (Table 36). Sites R2 and R1 follow the same seasonal patterns with temperature rising in the summer and falling in the winter with trends showing temperature has increased slightly after restoration (Figure 75).

Table 36. Temperature (°C) for all reaches and dates 2016-2020. Seasons are winter (W), spring (SP), summer (SU), and fall (F). **Indicates restoration was occurring, therefore a sample could not be obtained. Blanks indicated no data was collected. Note: C1 was not sampled until summer 2016 as it was not an original site in the project and was thus added on later.*

		A4	**A3**	**A2**	**A1**	**C1**	**C2**	**D2**	**D1**	**P1**	**R2**	**R1**
2016	W	6.1	6.6	8.4	8.3		10.1	10.7	10.7	10.4	9.4	8.9
	SP	16.5	16.8	16.7	17.3						17.8	17.8
	SU	21.6	18.5	23.6	24.5	26.2	24.7	25.8	26.7	24.0	23.3	24.5
	F	8.5	9.0	9.7	10.3	9.4	10.5	9.4	8.4	9.4	11.0	11.4
2017	SP	4.2	4.0	4.6	4.1	8.2	8.8	10.6	11.3	10.0	2.6	6.6
	SU	20.7	21.0	20.4	21.2	19.8	19.5	22.5	21.2	24.6	21.0	21.4
	F	11.1	12.5	11.1	11.4	12.0	12.3	11.6	11.6	12.5	12.5	14.0
2018	W	10.7	10.8	*	11.1	11.9	11.7	*	*	13.1	11.5	11.6
	SU	24.3	24.1	24.3	*	23.3	22.1	23.8	25.1	*	22.7	23.5
	F	16.2	17.2	17.0	17.1	14.3	14.3	14.3	14.8	15	*	*
2019	W	6.2	6.7	7.1	7.6	8.8	9.3	7.2	6.8	8.8	10.0	10.3
	SU	25.2	25.1	25.8	28.0	22.9	22.2	24.8	26.4	27.1	29.7	27.8
	F	9.2	11.1	10.2	11.1	12.9	11.6	8.5	9.7	10.3	12.0	11.8
2020	W	9.4	12.2	11.8	12.2	12.9	12.5	11.0	12.6	13.8	12.6	13.3
	SU	23.8	23.9	24.7	25.8	23.7	23.0	24.8	30.3	28.6	26.7	26.9

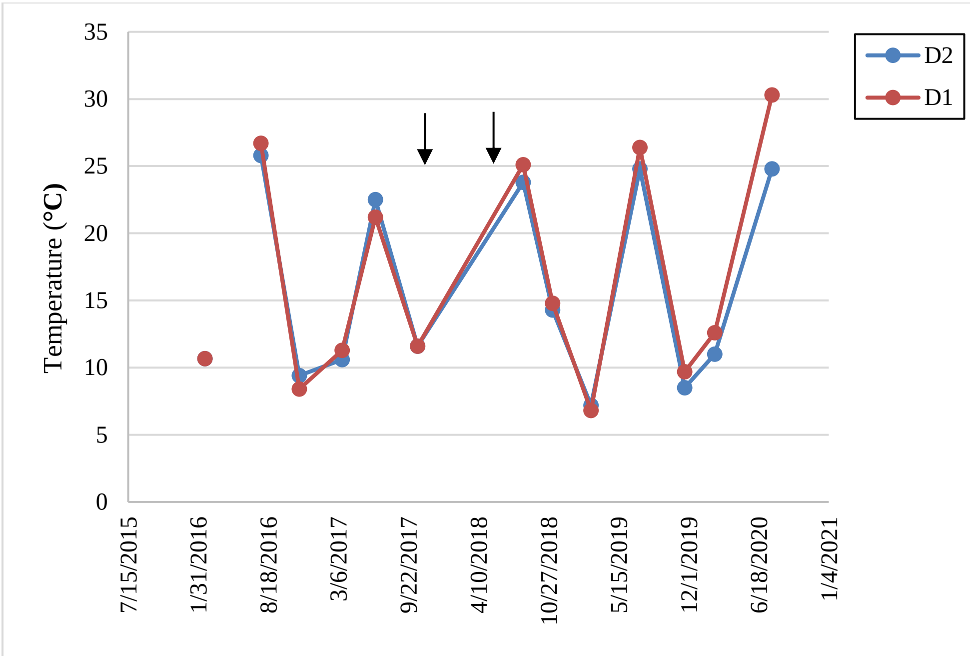

Figure 71. Temperature (°C) for the development influence sub-watershed from 2016-2020. Black arrows represent the start and end date of restoration construction, respectively.

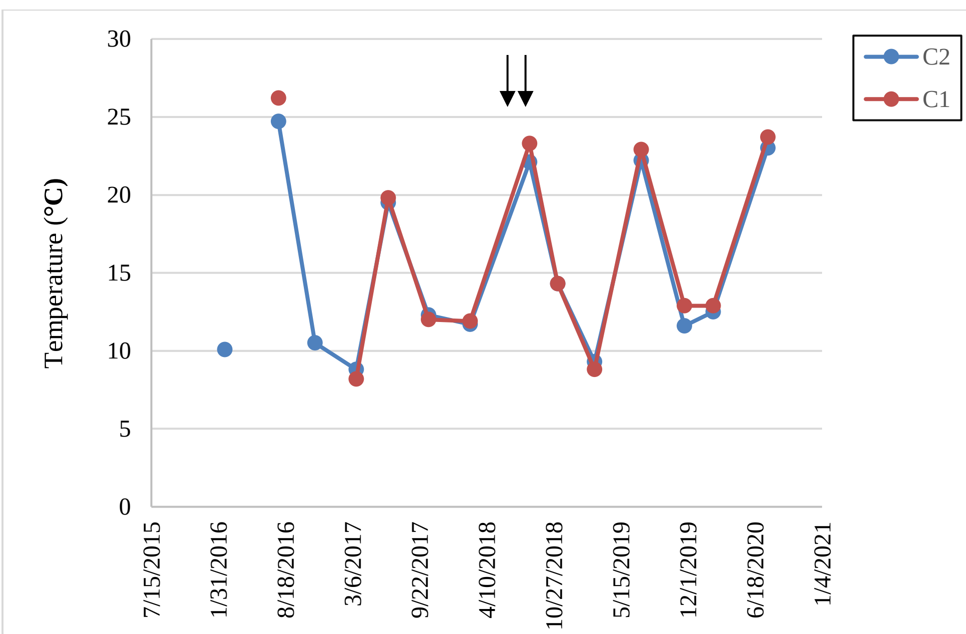

Figure 72. Temperature (°C) for the control sub-watershed from 2016-2020. Black arrows represent the start and end date of restoration construction respectively. *Note* C2 was not restored and C1 was restored.*

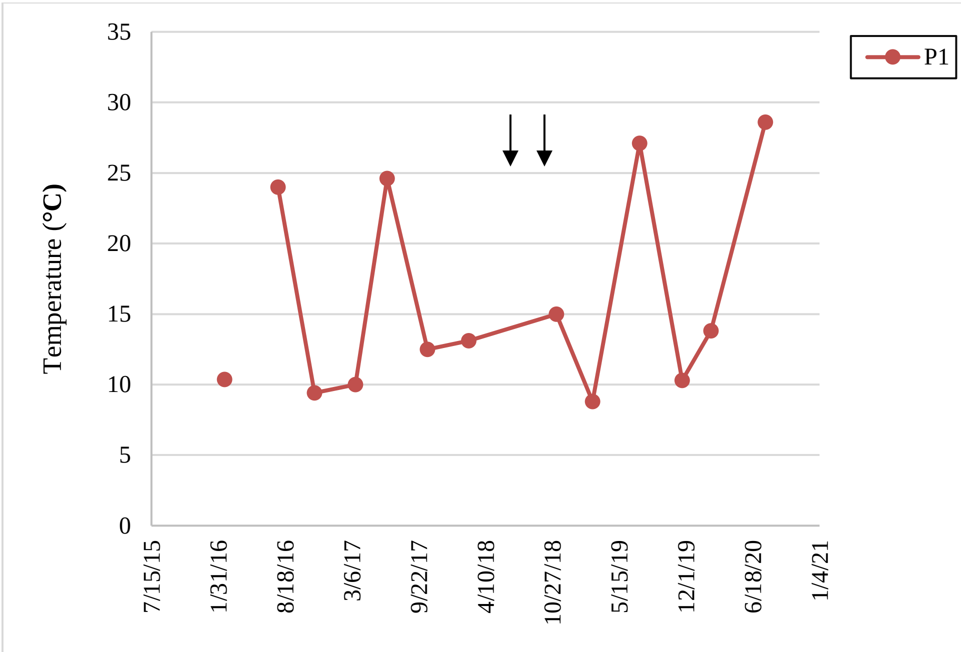

Figure 73. Temperature (°C) for the pond influence sub-watershed from 2016-2020. Black arrows represent the start and end date of restoration construction, respectively.

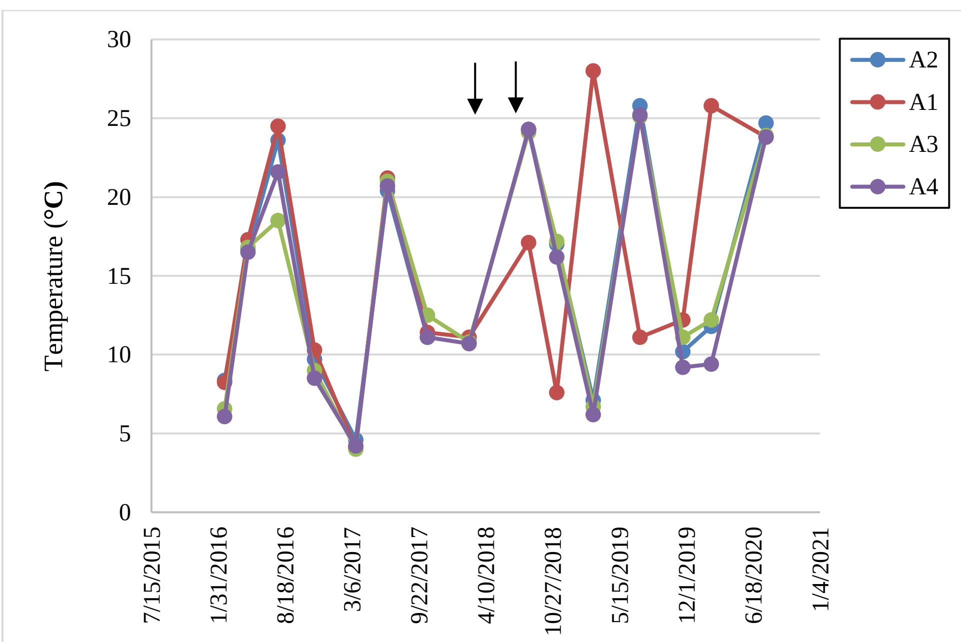

Figure 74. Temperature (°C) for the agricultural influence sub-watershed from 2016-2020. Black arrows represent the start and end date of restoration construction, respectively.

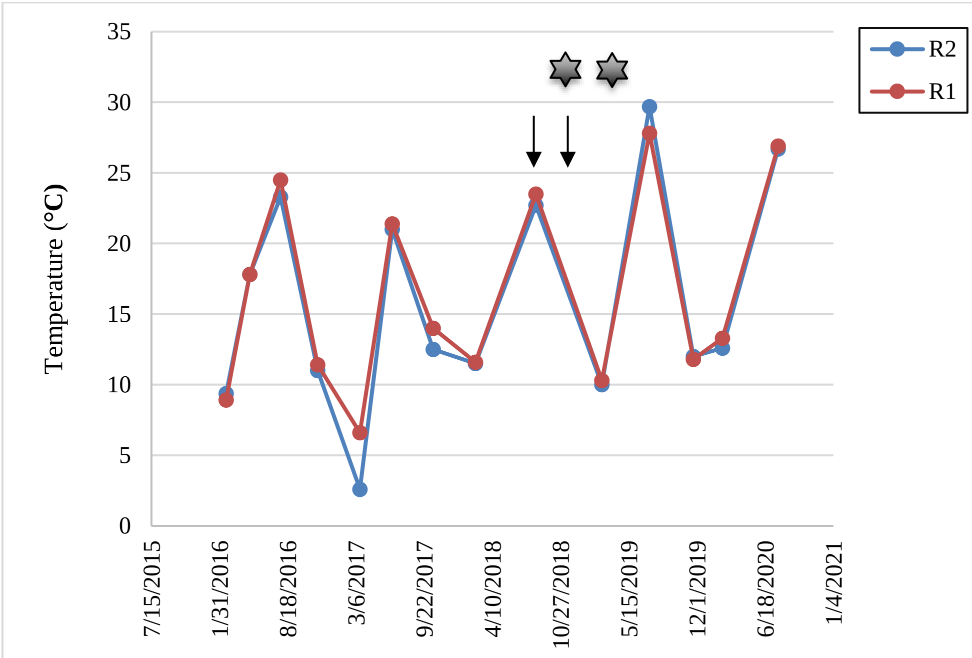

Figure 75. Temperature (°C) for the Reedy influence (mainstem) sub-watershed from 2016-2020. Black arrows represent the start and end date of restoration construction respectively for site R2. Black stars represent the start and end data of restoration construction respectively for site R1.

7.2.2: Dissolved Oxygen

For site D2, the dissolved oxygen in the summer was between 6.0 (mg/L) to 7.7 (mg/L) and in the winter was between 11.2 (mg/L) to 11.6 (mg/L) before restoration and after restoration the temperature in the summer was between 2.5 (mg/L) to 6.6 (mg/L) and in the winter was between 9.6 (mg/L) to 13.1 (mg/L) (Table 37). For site D1, the dissolved oxygen in the summer was between 6.9 (mg/L) to 7.9 (mg/L) and in the winter was between 10.9 (mg/L) to 11.6 (mg/L) before restoration and after restoration the temperature in the summer was between 3.1 (mg/L) to 6.8 (mg/L) and in the winter was between 9.9 (mg/L) to 11.7 (mg/L) (Table 37). Sites D2 and D1 follow the same seasonal patterns with dissolved oxygen concentrations being lower in the summer than in the winter with trends showing temperature has decreased slightly after restoration (Figure 76).

For site C2, the dissolved oxygen in the summer was between 8.5 (mg/L) to 8.9 (mg/L) and in the winter was between 10.3 (mg/L) to 11.8 (mg/L) before restoration and after restoration the dissolved oxygen in the summer was between 7.2 (mg/L) to 7.8 (mg/L) and in the winter was between 8.7 (mg/L) to 12.3 (mg/L) (Table 37). For site C1, the dissolved oxygen in the summer was between 6.3 (mg/L) to 8.2 (mg/L) and in the winter was between 10.2 (mg/L) to 11.8 (mg/L) before restoration and after restoration the dissolved oxygen in the summer was between 7.2 (mg/L) to 7.8 (mg/L) and in the winter was between 7.3 (mg/L) to 9.8 (mg/L) (Table 37). Sites C2 and C1 follow the same seasonal patterns with dissolved oxygen concentrations being lower in the summer than in the winter with trends showing dissolved oxygen has decreased slightly after restoration (Figure 77).

For site P1, the dissolved oxygen in the summer was between 6.5 (mg/L) to 9.1 (mg/L) and in the winter was between 10.1 (mg/L) to 11.3 (mg/L) before restoration and after restoration the dissolved oxygen in the summer was between 6.0 (mg/L) to 6.2 (mg/L) and in the winter was between 8.3 (mg/L) to 11.4 (mg/L) (Table 37). P1 had lower dissolved oxygen concentrations in the summer than in the winter and trends show dissolved oxygen is slightly decreasing after restoration (Figure 78).

For site A4, the dissolved oxygen in the summer was between 6.4 (mg/L) to 7.3 (mg/L) and in the winter was between 10.7 (mg/L) to 13.2 (mg/L) before restoration and after restoration the dissolved oxygen in the summer was between 2.0 (mg/L) to 5.5 (mg/L) and in the winter was between 9.9 (mg/L) to 11.2 (mg/L) (Table 37). For site A3, the dissolved oxygen in the summer was between 6.4 (mg/L) to 7.3 (mg/L) and in the winter was between 5.1 (mg/L) to 12.9 (mg/L) before restoration and after restoration the dissolved oxygen in the summer was between 1.2 (mg/L) to 3.7 (mg/L) and in the winter was between 7.4 (mg/L) to 9.6 (mg/L) (Table 37). For site A2, the dissolved oxygen in the summer was between 7.3 (mg/L) to 7.9 (mg/L) and in the winter was between 11.6 (mg/L) to 12.9 (mg/L) before restoration and after restoration the dissolved oxygen in the summer was between 1.1 (mg/L) to 4.1 (mg/L) and in the winter was between 8.9 (mg/L) to 10.9 (mg/L) (Table 37). For site A1, the dissolved oxygen in the summer was between 8.1 (mg/L) to 9.9 (mg/L) and in the winter was between 11.1 (mg/L) to 13.6 (mg/L) before restoration and after restoration the dissolved oxygen in the summer was between 5.1 (mg/L) to 5.4 (mg/L) and in the winter was between 10.0 (mg/L) to 14.4 (mg/L) (Table 37). Sites A4, A3, A2, and A1 follow the same seasonal patterns with dissolved oxygen concentrations being lower in the summer than in the winter with trends showing dissolved oxygen has decreased slightly after restoration (Figure 79).

For site R2, the dissolved oxygen in the summer was between 6.7 (mg/L) to 8.5 (mg/L) and in the winter was between 10.4 (mg/L) to 14.8 (mg/L) before restoration and after restoration the dissolved oxygen in the summer was between 6.5 (mg/L) to 7.2 (mg/L) and in the winter was between 9.0 (mg/L) to 12.9 (mg/L) (Table 37). For site R1, the dissolved oxygen in the summer was between 6.1 (mg/L) to 8.8 (mg/L) and in the winter was between 10.6 (mg/L) to 12.3 (mg/L) before restoration and after restoration the dissolved oxygen in the summer was between 6.3 (mg/L) to 6.7 (mg/L) and in the winter was between 10.8 (mg/L) to 13.8 (mg/L) (Table 37). Sites A4, A3, A2, and A1 follow the same seasonal patterns with dissolved oxygen concentrations being lower in the summer than in the winter with trends showing dissolved oxygen has decreased slightly after restoration (Figure 80).

Table 37. Dissolved Oxygen (mg/L) for all reaches and dates 2016-2020. Seasons are winter (W), summer (SU), and fall (F). **Indicates restoration was occurring, therefore a sample could not be obtained. Blanks indicated not data was collected. Note: C1 was not sampled until summer 2016 as it was not an original site in the project and was thus added on later.*

		A4	A3	A2	A1	C1	C2	D2	D1	P1	R2	R1
2016	W	11.6	11.9	11.6	11.5		11.0	11.6	11.6	11.3	11.3	11.5
	SP											
	SU	7.3	12.9	7.3	8.5	6.3	8.6	6.4	7.9	7.4	8.5	8.1
	F	9.3	7.8	10.2	13.6		8.8	6.7	11.5	9.3	10.4	11.5
2017	SP	13.2	13.2	12.9	13.1	11.8	11.8	11.2	10.9	11.4	14.8	12.3
	SU	6.4	10.7	7.9	8.1	8.0	8.5	7.7	6.9	6.5	7.9	8.0
	F	8.8	5.1	7.8	9.9	9.8	8.9	6.0	8.0	9.2	8.5	9.0
2018	W	10.7	10.2	*	11.1	10.2	10.3	*	*	10.1	10.8	10.6
	SU	2.0	1.2	1.1	*	8.2	7.2	2.5	3.1	*	6.7	6.1
	F	10.7	7.4	8.9	10.7	10.0	10.1	8.5	8.7	8.3	*	*
2019	W	9.9	9.6	9.0	10.0	8.8	8.7	9.6	9.9	9.0	9.3	8.1
	SU	5.5	3.7	2.3	5.4	9.8	7.8	2.5	5.5	6.0	6.5	6.7
	F	11.0	10.1	10.9	14.2	10.5	9.7	10.4	11.3	11.2	12.9	13.8
2020	W	11.2	9.2	9.5	11.9	11.5	12.3	13.1	11.7	11.4	12.7	10.8
	SU	4.5	3.3	4.1	5.1	7.3	7.5	6.6	6.8	6.2	7.2	6.3

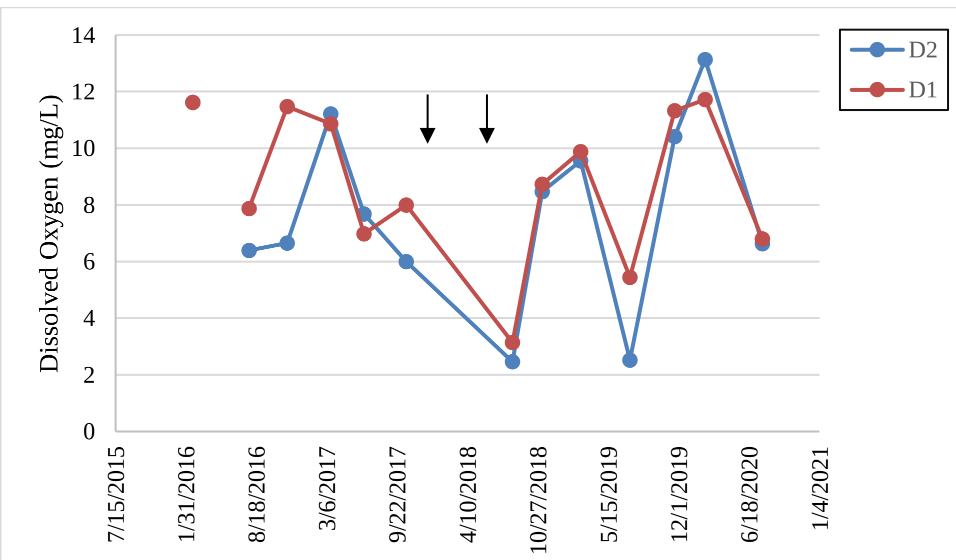

Figure 76. Dissolved oxygen (mg/L) concentrations for the development influence sub-watershed from 2016-2020. Black arrows represent the start and end date of restoration construction, respectively.

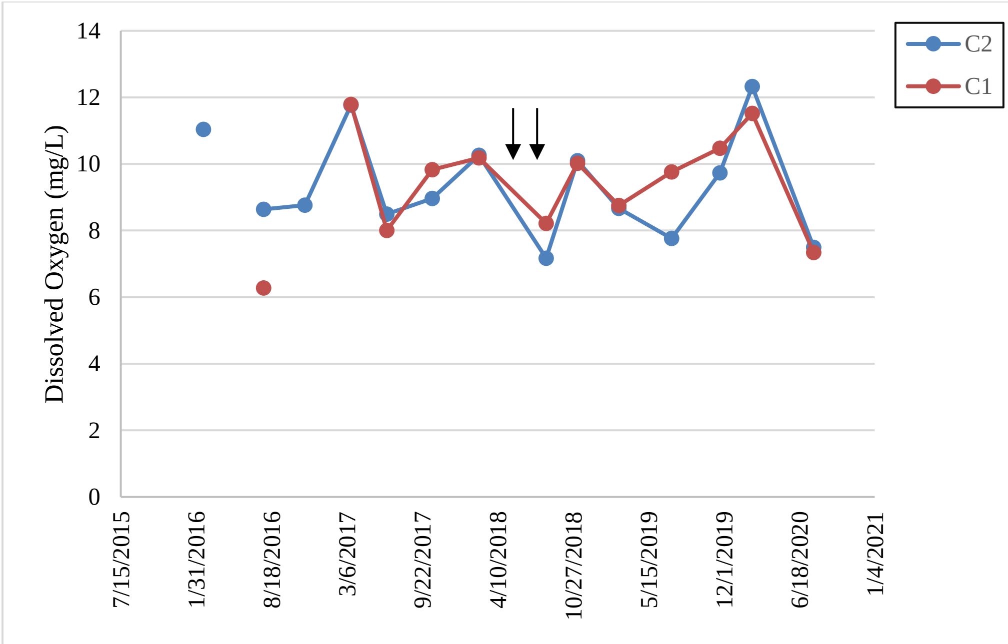

Figure 77. Dissolved oxygen (mg/L) concentrations for the control sub-watershed from 2016-2020. Black arrows represent the start and end date of restoration construction respectively for C1. **Note C2 was not restored.*

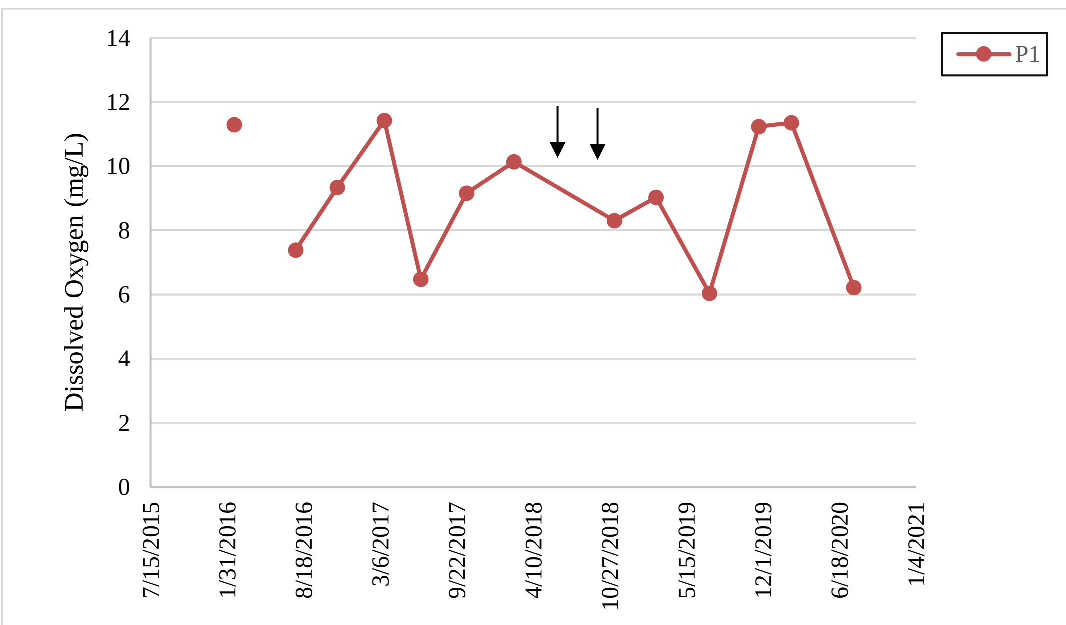

Figure 78. Dissolved oxygen (mg/L) concentrations for the pond influence sub-watershed from 2016-2020. Black arrows represent the start and end date of restoration construction, respectively.

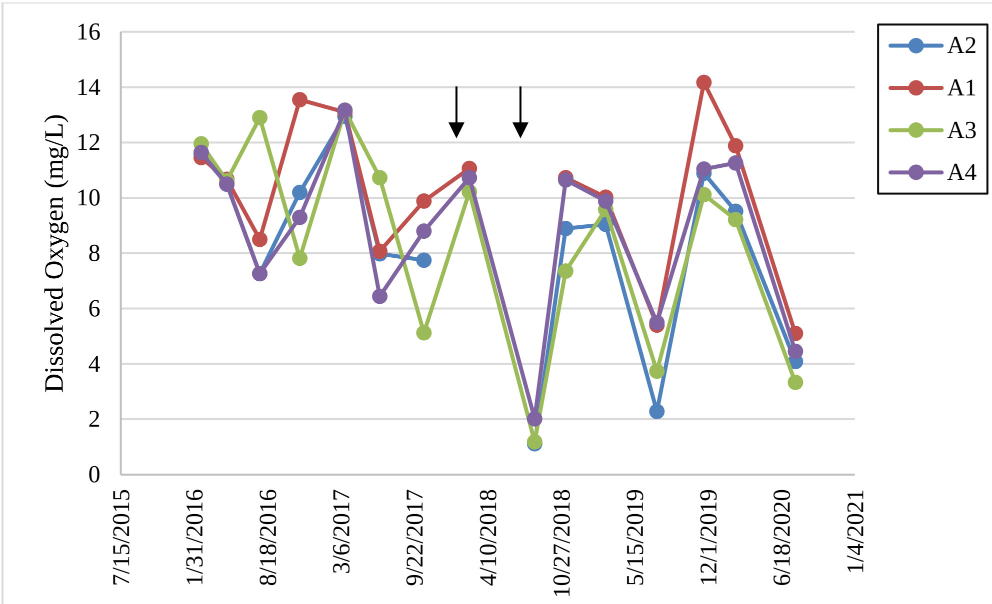

Figure 79. Dissolved oxygen (mg/L) concentrations for the agricultural influence sub-watershed from 2016-2020. Black arrows represent the start and end date of restoration construction respectively.

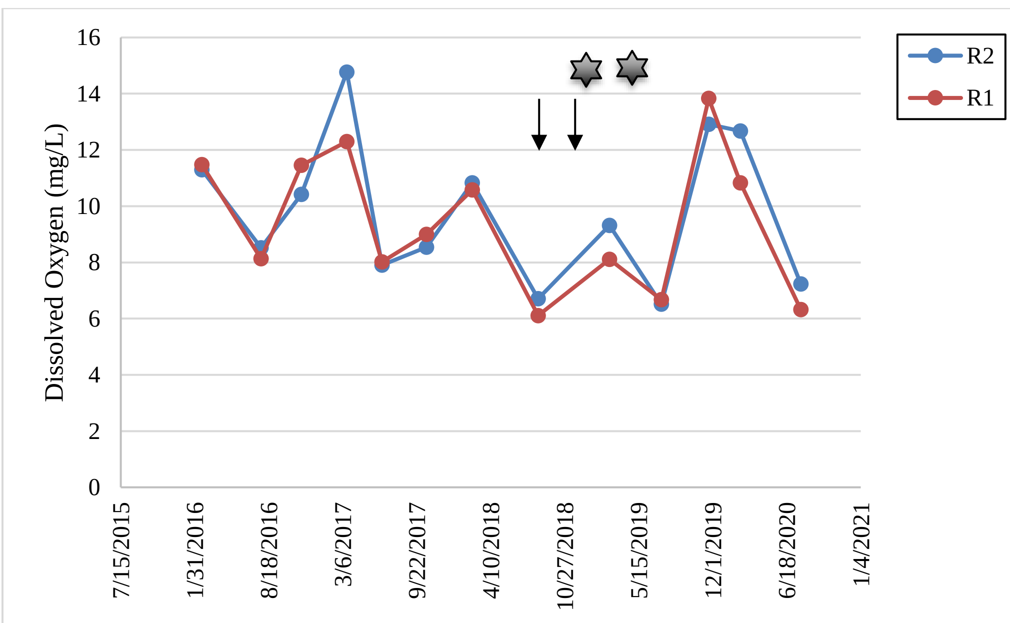

Figure 80. Dissolved oxygen (mg/L) concentrations for the Reedy influence (mainstem) sub-watershed from 2016-2020. Black arrows represent the start and end date of restoration construction respectively for site R2. Black stars represent the start and end data of restoration construction respectively for site R1.

7.2.3: pH

For site D2, the pH in the summer was between 6.99 to 7.99 and in the winter was between 6.51 to 8.67 before restoration and after restoration the pH in the summer was between 5.72 to 6.68 and in the winter was between 5.47 to 6.20 (Table 38). For site D1, the pH in the summer was between 6.55 to 7.20 and in the winter was between 7.92 to 8.67 before restoration and after restoration the pH in the summer was between 6.60 to 6.68 and in the winter was between 5.91 to 5.99 (Table 38). For sites D2 and D1, pH before restoration was lower in the summer and higher in the winter. After restoration, that trend was not as clear, but pH did decrease (Figure 81).

For site C2, the pH in the summer was between 6.80 to 7.51 and in the winter was between 6.41 to 9.20 before restoration and after restoration the pH in the summer was between 6.52 to 6.71 and in the winter was between 5.53 to 6.35 (Table 38). For site C1, the pH in the summer was between 6.87 to 7.54 and in the winter was between 6.60 to 6.99 before restoration and after restoration the pH in the summer was between 6.50 to 6.47 and in the winter was between 5.96 to 6.17 (Table 38). For sites C2 and C1, pH was higher in the summer and lower in the winter with trends showing pH has decreased after restoration (Figure 82).

For site P1, the pH in the summer was between 7.02 to 7.44 and in the winter was between 6.45 to 9.31 before restoration and after restoration the pH in the summer was between 6.34 to 6.67 and in the winter was between 5.73 to 6.21 (Table 38). For site P1, pH varied seasonally but trends indicate pH has decreased after restoration (Figure 83).

For site A4, the pH in the summer was between 7.20 to 7.76 and in the winter was between 5.06 to 7.08 before restoration and after restoration the pH in the summer was between 6.42 to 6.57 and in the winter was between 5.58 to 6.56 (Table 38). For site A3, the pH in the summer was between 6.80 to 7.18 and in the winter was between 5.80 to 7.54 before restoration and after restoration the pH in the summer was between 6.45 to 6.60 and in the winter was between 6.11 to 6.49 (Table 38). For site A2, the pH in the summer was between 6.98 to 7.49 and in the winter was between 5.54 to 6.96 before restoration and after restoration the pH in the summer was between 6.63 to 7.03 and in the winter was between 6.16 to 6.38 (Table 38). For site A1, the pH in the summer was between 6.83 to 7.56 and in the winter was between 6.24 to 7.07 before restoration and after restoration the pH in the summer was between 6.71 to 6.82 and in the winter was between 5.93 to 6.38 (Table 38). For sites A4, A3, A2, and A1, pH was higher in the summer and lower in the winter with trends showing pH has decreased after restoration (Figure 84).

For site R2, the pH in the summer was between 5.53 to 7.07 and in the winter was between 6.17 to 8.52 before restoration and after restoration the pH in the summer was between 6.9 to 7.27 and in the winter was between 5.93 to 6.39 (Table 38). For site R1, the pH in the summer was between 6.93 to 7.45 and in the winter was between 6.74 to 7.55 before restoration and after restoration the pH in the summer was between 6.85 to 7.17 and in the winter was between 5.98 to 6.57 (Table 38). For sites R2 and R1, pH varied seasonally but trends indicate pH has decreased after restoration (Figure 85).

Table 38. pH for all reaches and dates 2016-2020. Seasons are winter (W), spring (SP), summer (SU), and fall (F). **Indicates restoration was occurring, therefore a sample could not be obtained. Blanks indicated no data was collected. Note: C1 was not sampled until summer 2016 as it was not an original site in the project and was thus added on later*.

		A4	A3	A2	A1	C1	C2	D2	D1	P1	R2	R1
2016	W	6.62	7.54	5.54	7.07		9.20	7.92	7.92	9.31	8.52	7.55
	SP	6.00	5.68	5.47	5.53						5.53	5.33
	SU	7.76	7.18	7.49	7.56	7.54	7.51	7.18	7.05	7.44	7.39	7.45
	F	8.30	7.35	7.31	7.59		6.77	6.40	6.51	6.40	7.37	7.11
2017	SP	7.08	7.06	6.96	6.24	6.99	6.42	8.38	8.67	7.57	7.40	7.40
	SU	7.20	6.80	6.98	6.83	6.87	6.80	7.99	6.55	7.02	6.70	6.93
	F	7.02	7.21	7.38	7.46	7.02	7.12	6.99	7.20	7.17	6.90	7.25
2018	W	5.06	5.80	*	6.20	6.60	6.85	*	*	6.45	6.17	6.74
	SU	5.90	6.44	6.63	*	7.47	7.01	6.26	6.68	*	7.07	7.01
	F	6.13	6.25	6.49	6.66	6.19	6.17	5.96	6.07	6.07	*	*
2019	W	6.56	6.49	6.38	6.38	6.17	6.35	6.20	5.99	6.21	6.39	6.57
	SU	6.42	6.47	6.73	6.71	6.79	6.71	5.72	6.67	6.67	7.27	7.17
	F	5.24	5.42	5.97	5.51	5.85	5.74	5.95	6.06	6.07	5.64	5.62
2020	W	5.58	6.11	6.16	5.93	5.96	5.53	5.47	5.91	5.73	5.93	5.98
	SU	6.57	6.60	7.03	6.82	6.50	6.52	6.68	6.60	6.34	6.90	6.85

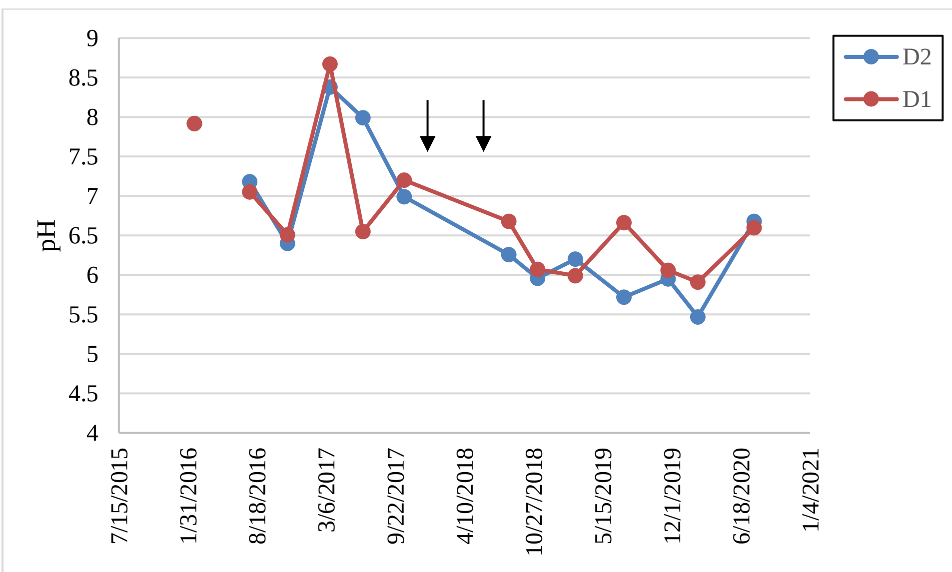

Figure 81. pH level for the development influence sub-watershed from 2016-2020. Black arrows represent the start and end date of restoration construction, respectively.

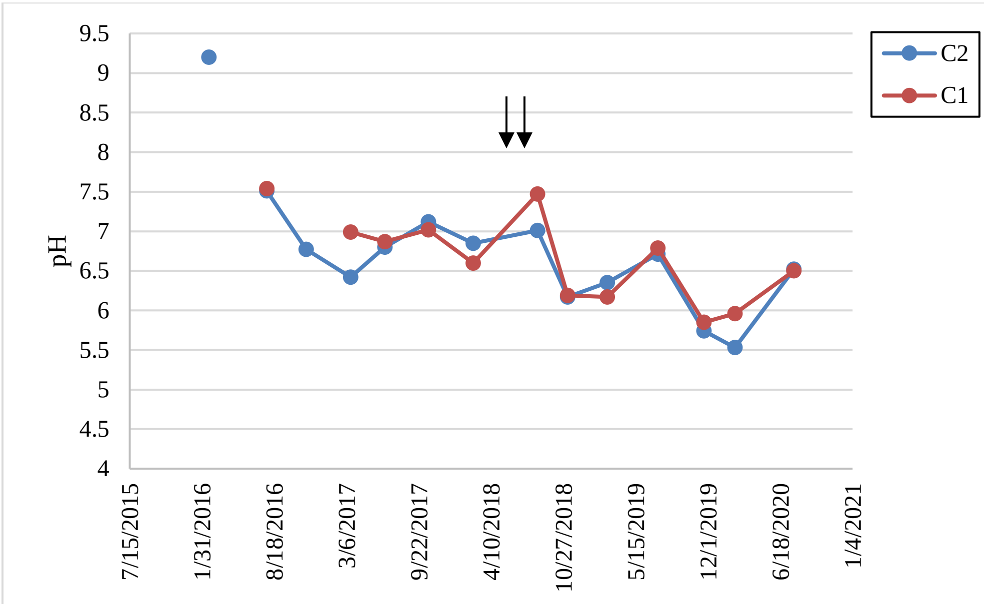

Figure 82. pH level for the control sub-watershed from 2016-2020. Black arrows represent the start and end date of restoration construction respectively for C1. *Note* C2 was not restored.*

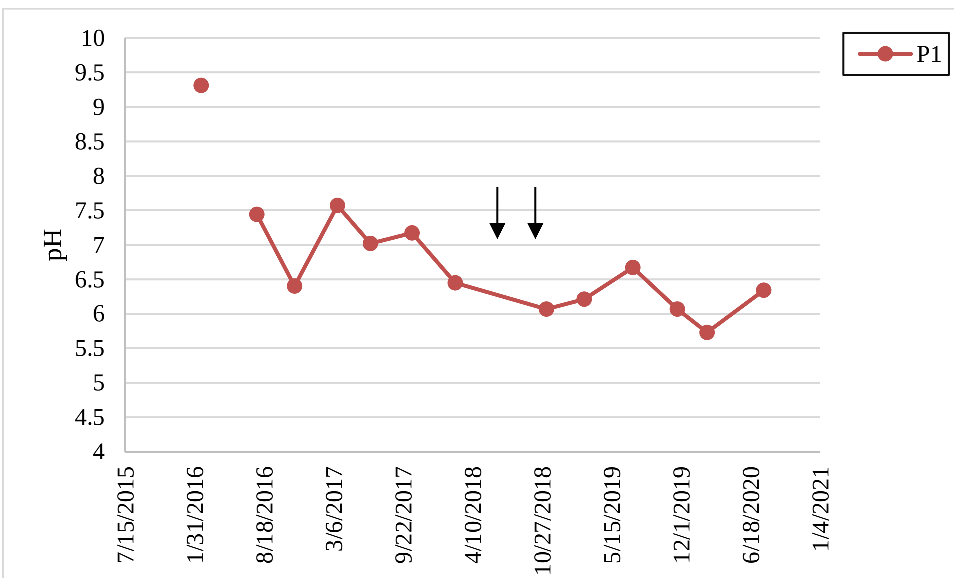

Figure 83. pH level for the pond influence sub-watershed from 2016-2020. Black arrows represent the start and end date of restoration construction, respectively.

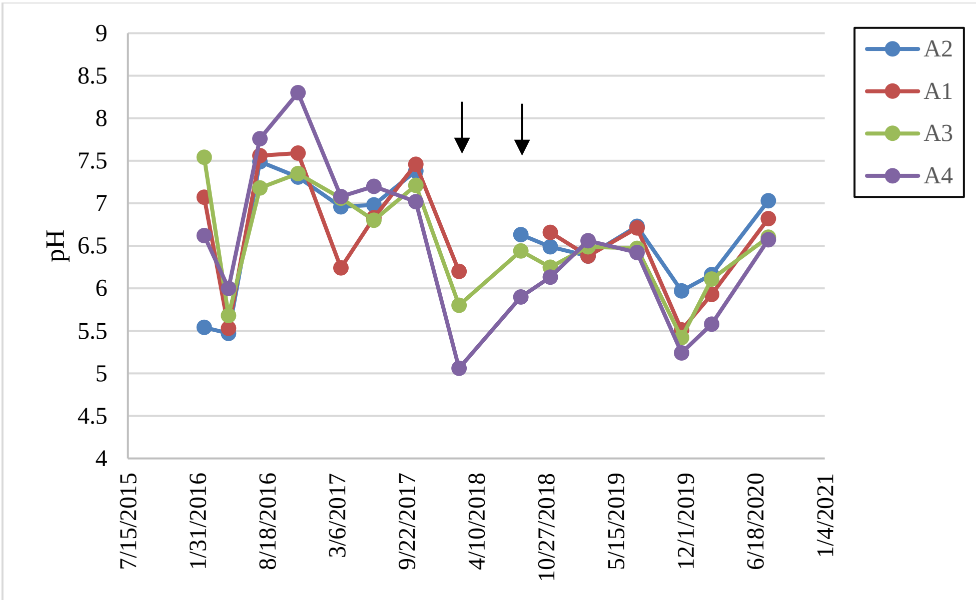

Figure 84. pH level for the agricultural influence sub-watershed from 2016-2020. Black arrows represent the start and end date of restoration construction, respectively.

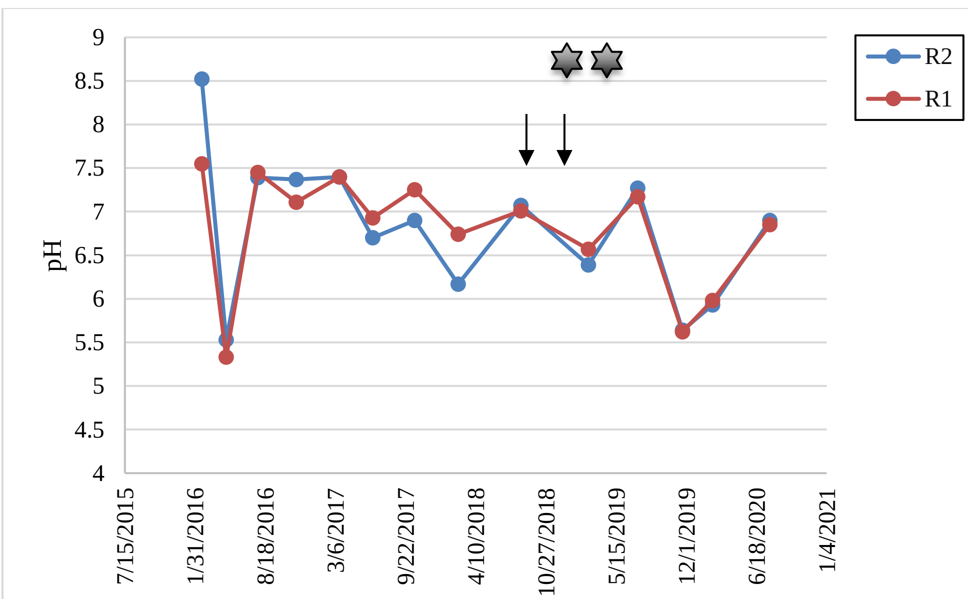

Figure 85. pH level for the Reedy influence (mainstem) sub-watershed from 2016-2020. Black arrows represent the start and end date of restoration construction respectively for site R2. Black stars represent the start and end data of restoration construction respectively for site R1.

7.2.4: Specific Conductivity

For site D2, the specific conductance in the summer was between 106 (µS/cm) to 249 (µS/cm) and in the winter was between 84 (µS/cm) to 96 (µS/cm) before restoration and after restoration the specific conductance in the summer was between 175 (µS/cm) to 226 (µS/cm) and in the winter was between 68 (µS/cm) to 83 (µS/cm) (Table 39). For site D1, the specific conductance in the summer was between 91 (µS/cm) to 110 (µS/cm) and in the winter was between 84 (µS/cm) to 90 (µS/cm) before restoration and after restoration the specific conductance in the summer was between 174 (µS/cm) to 231 (µS/cm) and in the winter was between 31 (µS/cm) to 43 (µS/cm) (Table 39). For sites D2 and D1, specific conductance was higher in the summer than in the winter. After restoration, specific conductance decreased but has been gradually increasing after the initial construction (Figure 86).

For site C2, the specific conductance in the summer was between 47 (µS/cm) to 73 (µS/cm) and in the winter was between 36 (µS/cm) to 42 (µS/cm) before restoration and after restoration the specific conductance in the summer was between 52 (µS/cm) to 58 (µS/cm) and in the winter was between 29 (µS/cm) to 36 (µS/cm) (Table 39). For site C1, the specific conductance in the summer was between 49 (µS/cm) to 86 (µS/cm) and in the winter was between 37 (µS/cm) to 42 (µS/cm) before restoration and after restoration the specific conductance in the summer was between 62 (µS/cm) to 68 (µS/cm) and in the winter was between 27 (µS/cm) to 23 (µS/cm) (Table 39). For sites C2 and C1, specific conductance was higher in the summer than in the winter. After restoration, specific conductance decreased but has been gradually increasing after the initial construction (Figure 87).

For site P1, the specific conductance in the summer was between 66 (µS/cm) to 146 (µS/cm) and in the winter was between 49 (µS/cm) to 69 (µS/cm) before restoration and after restoration the specific conductance in the summer was 130 (µS/cm) and in the winter was between 60 (µS/cm) to 61 (µS/cm) (Table 39). Specific conductance was higher in the summer than in the winter. After restoration, specific conductance decreased but has been gradually increasing after the initial construction (Figure 88).

For site A4, the specific conductance in the summer was between 107 (µS/cm) to 146 (µS/cm) and in the winter was between 53 (µS/cm) to 74 (µS/cm) before restoration and after restoration the specific conductance in the summer was between 115 (µS/cm) to 138 (µS/cm) and in the winter was between 48 (µS/cm) to 72 (µS/cm) (Table 39). For site A3, the specific conductance in the summer was between 74 (µS/cm) to 141 (µS/cm) and in the winter was between 61 (µS/cm) to 93 (µS/cm) before restoration and after restoration the specific conductance in the summer was between 91 (µS/cm) to 290 (µS/cm) and in the winter was between 91 (µS/cm) to 110 (µS/cm) (Table 39). For site A2, the specific conductance in the summer was between 94 (µS/cm) to 134 (µS/cm) and in the winter was between 87 (µS/cm) to 97 (µS/cm) before restoration and after restoration the specific conductance in the summer was between 191 (µS/cm) to 210 (µS/cm) and in the winter was between 32 (µS/cm) to 126 (µS/cm) (Table 39). For site A1, the specific conductance in the summer was between 117 (µS/cm) to 153 (µS/cm) and in the winter was between 66 (µS/cm) to 79 (µS/cm) before restoration and after restoration the specific conductance in the summer was between 93 (µS/cm) to 163 (µS/cm) and in the winter was between 93 (µS/cm) to 105 (µS/cm) (Table 39). For sites

A4, A3, A2, and A1 specific conductance was higher in the summer than in the winter. After restoration, specific conductance has been gradually increasing (Figure 89).

For site R2, the specific conductance in the summer was between 97 (µS/cm) to 127 (µS/cm) and in the winter was between 54 (µS/cm) to 79 (µS/cm) before restoration and after restoration the specific conductance in the summer was between 114 (µS/cm) to 137 (µS/cm) and in the winter was between 60 (µS/cm) to 61 (µS/cm) (Table 39).

For site R1, the specific conductance in the summer was between 100 (µS/cm) to 142 (µS/cm) and in the winter was between 59 (µS/cm) to 81 (µS/cm) before restoration and after restoration the specific conductance in the summer was between 136 (µS/cm) to 152 (µS/cm) and in the winter was between 72 (µS/cm) to 73 (µS/cm) (Table 39). For sites R2 and R1, specific conductance was higher in the summer than in the winter. After restoration, specific conductance has been gradually increasing (Figure 90).

Table 39. Specific conductivity (µS/cm) for all reaches and dates 2016-2020. Seasons are winter (W), spring (SP), summer (SU), and fall (F). **Indicates restoration was occurring, therefore a sample could not be obtained. Blanks indicated no data was collected. Note: C1 was not sampled until summer 2016 as it was not an original site in the project and was thus added on later.*

		A4	A3	A2	A1	C1	C2	D2	D1	P1	R2	R1
2016	W	53	61	88	66		36	84	84	49	64	59
	SP	73	88	112	93						78	63
	SU	146	141	134	153	86	73	249	110	146	97	130
	F	87	93	117	107		47	158	97	113	96	101
2017	SP	62	73	97	77	37	36	96	90	64	54	74
	SU	107	74	94	117	49	47	106	91	66	99	100
	F	107	98	106	108	49	47	170	86	113	86	95
2018	W	74	70	87	79	42	42	*	*	69	79	81
	SU	147	290	71	*	62	61	175	174	*	127	141
	F	91	151	157	140	52	43	115	102	102	*	*
2019	W	48	110	32	105	27	36	68	63	31	61	73
	SU	138	180	210	163	63	52	226	231	130	137	152
	F	89	122	167	137	52	47	130	106	81	94	103
2020	W	72	91	126	93	33	29	83	79	43	60	72
	SU	115	166	191	172	68	58	236	181	130	114	136

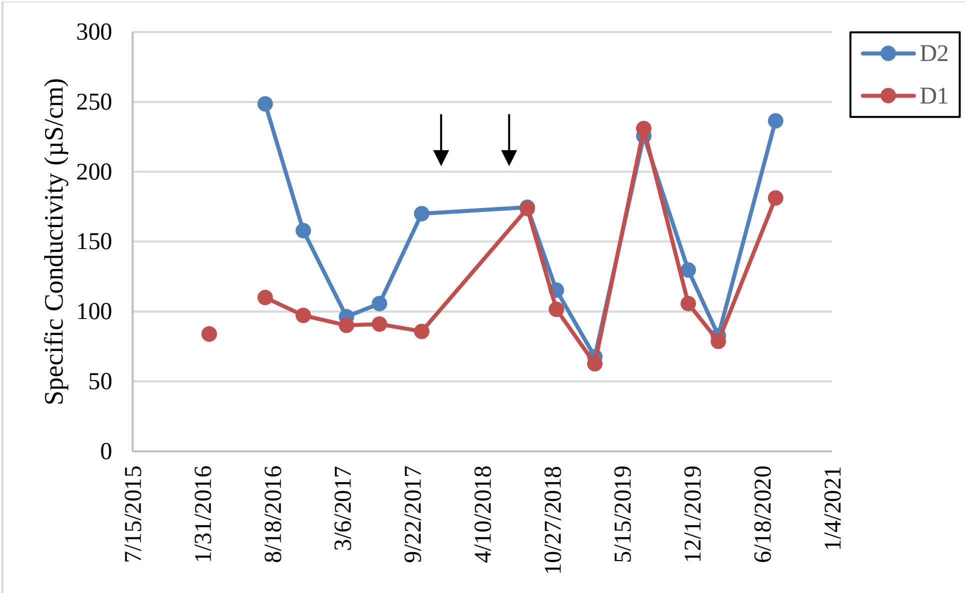

Figure 86. Specific conductivity (µS/cm) for the development influence sub-watershed from 2016-2020. Black arrows represent the start and end date of restoration construction, respectively.

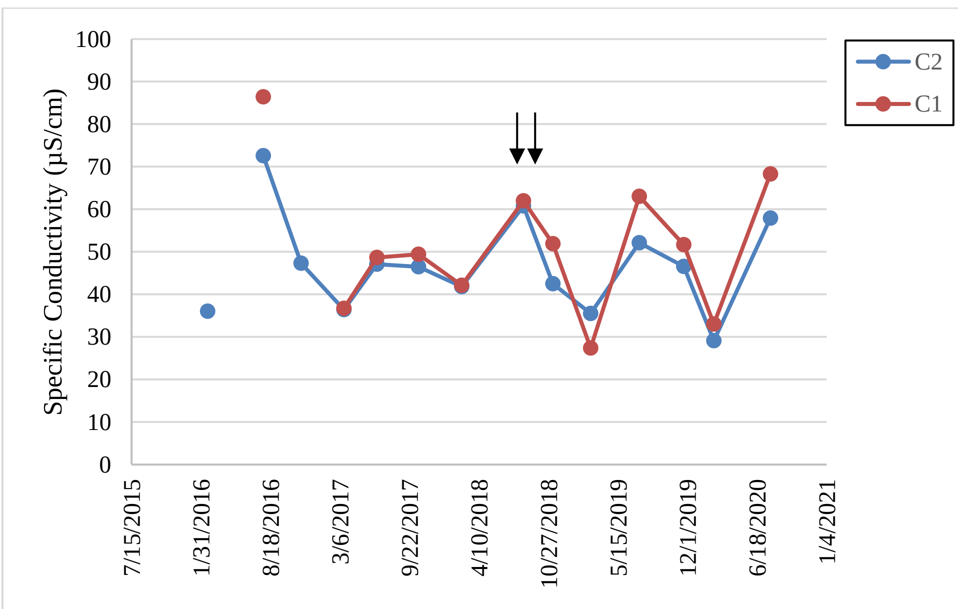

Figure 87. Specific conductivity (µS/cm) for the control sub-watershed from 2016-2020. Black arrows represent the start and end date of restoration construction respectively for C1. *Note* C2 was not restored.*

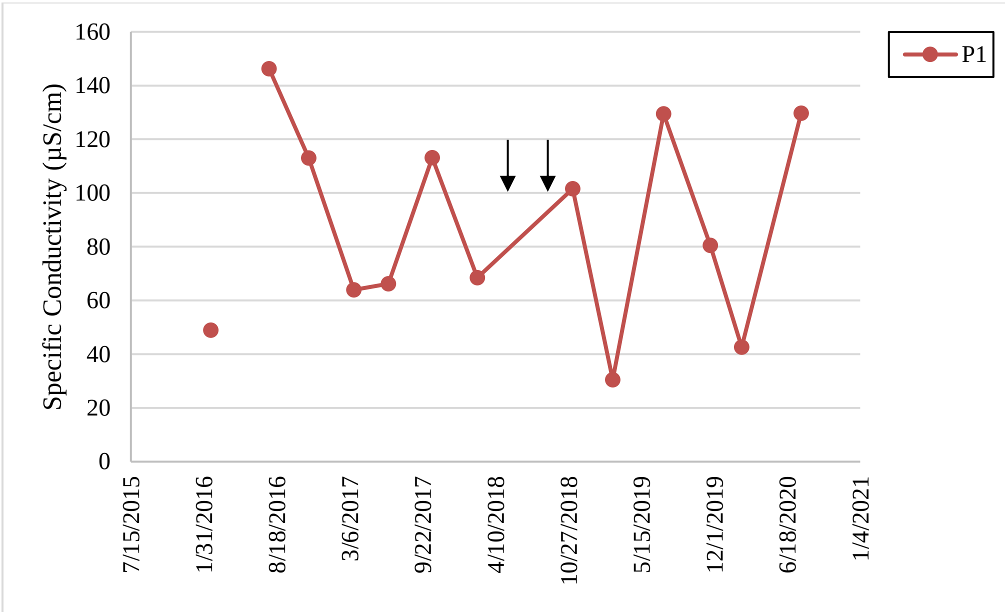

Figure 88. Specific conductivity (µS/cm) for the pond influence sub-watershed from 2016-2020. Black arrows represent the start and end date of restoration construction, respectively.

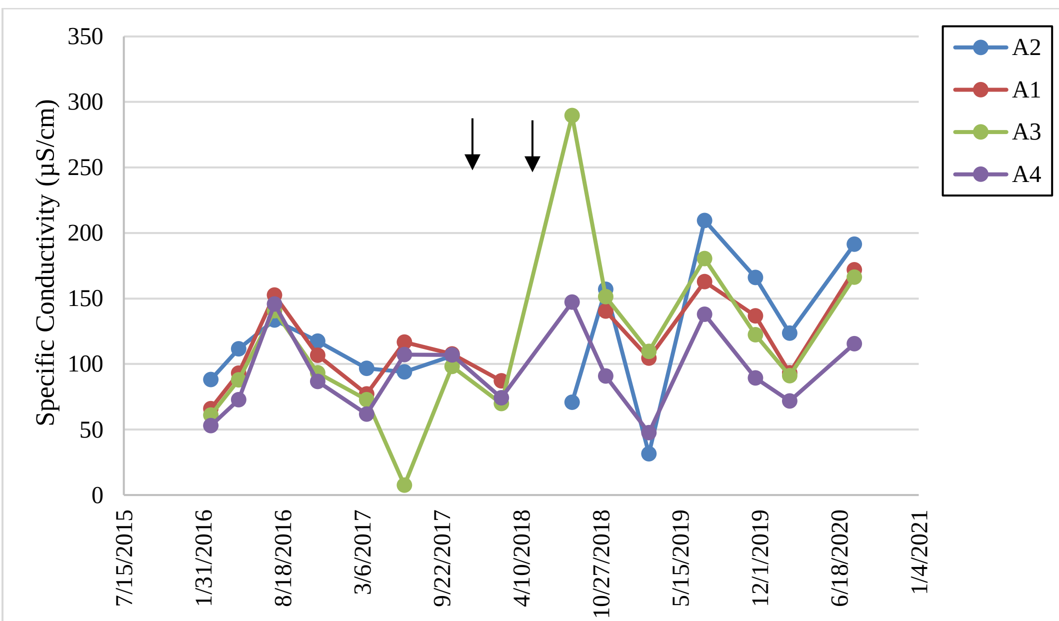

Figure 89. Specific conductivity (µS/cm) for the agricultural influence sub-watershed from 2016-2020. Black arrows represent the start and end date of restoration construction, respectively.

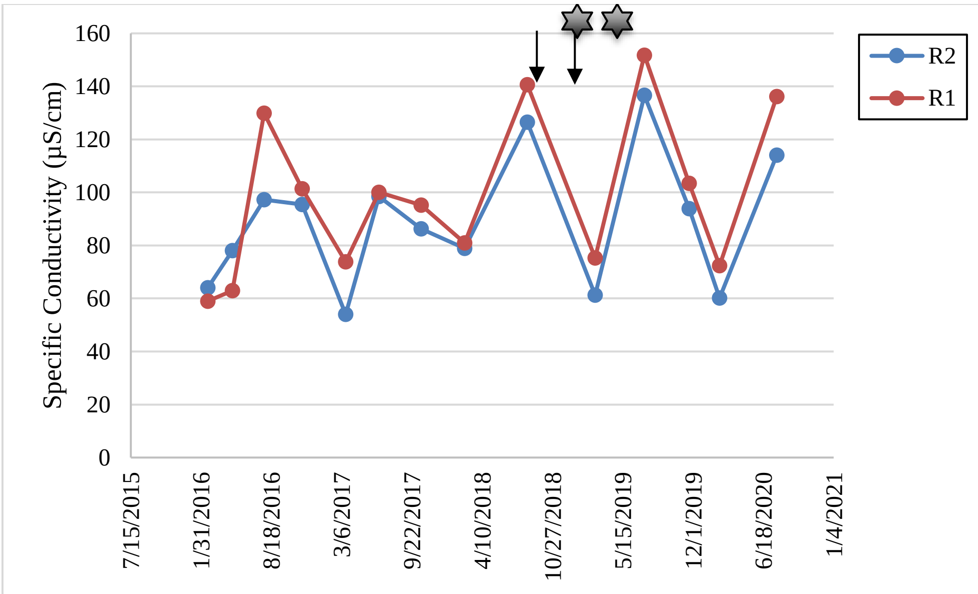

Figure 90. Specific conductivity (µS/cm) for the Reedy influence (mainstem) sub-watershed from 2016-2020. Black arrows represent the start and end date of restoration construction respectively for site R2. Black stars represent the start and end data of restoration construction respectively for site R1.

SECTION 8: DISCUSSION

8.1: Macroinvertebrate Community Composition

8.1.1: Taxa Richness

After restoration, taxa richness increased in the development sub-watershed and site C1, decreased in the agricultural sub-watershed, and there was no change in the forested control (C2), pond influence, or the mainstem sub-watershed. The forested control (C2) had the greatest taxa richness before and after restoration which reflects that pre-restoration habitat was good, and the channel morphology was not degraded. C1 taxa richness increased after restoration and had greater taxa richness than all the other sites, except for C2. The highest taxa richness was in the forested control sub-watershed followed by the agricultural, development, mainstem, and the pond influence sub-watershed, respectively. Taxa richness is a biotic metric that is sensitive to environmental variation and changes with different land-use influence. Taxa richness has been found to be greater in streams that have less urban influence in twenty-two stream sites in Virginia (Jones and Clark 1987).

8.1.2: EPT Richness

After restoration, EPT richness decreased in the forested control (C1), decreased in the agricultural sub-watershed and there was no change in EPT richness for the forested control (C2), development, pond influence, and mainstem sub-watershed. EPT richness was greatest at C2 followed by C1, the agricultural sub-watershed, mainstem sub-watershed, the developed sub-watershed, and the pond influence sub-watershed.

Within the sub-watersheds, the confluences had greater EPT richness. In addition to taxa richness, EPT richness is especially sensitive to environmental variation as most EPT taxa are sensitive to changes in pollutants and elevated nutrient concentrations, which are both common characteristics of urban streams (Walsh et al. 2005). For site C1, the decline in EPT richness was offset by an increase in tolerant taxa. This may indicate site C1 is experiencing moderate stress as North Carolina Piedmont streams that experience the same pattern of an increase in tolerant taxa accompanied by a decrease in sensitive taxa are deemed to have fair water quality (Lenat and Crawford 1994). As C1 is downstream of C2, the forested control, it would be interesting to revisit this site in future years to quantify changes in taxa abundance and richness.

8.1.3: Abundance

After restoration, abundance increased within all sub-watersheds. Abundance was greatest in the agricultural sub-watershed followed by site C1, control site C2, the development sub-watershed, the mainstem sub-watershed, and the pond influence sub-watershed. In the North Carolina Piedmont, three streams studied to determine the impact of land-use on macroinvertebrates also found that streams influenced by agricultural land-use had the highest abundance, indicating impacts from nutrient enrichment, and streams influenced by urban development had low abundance (Lenat and Crawford 1994). For the agricultural sub-watershed, Diptera taxa were most abundant followed by Gastropoda. For the forested control sub-watershed, abundance was spread evenly amongst Diptera, Trichoptera, and Ephemeroptera. For the development sub-watershed, Diptera and Trichoptera were both abundant. For the mainstem sub-watershed, Ephemeroptera and Diptera were both abundant. For the pond influence sub-watershed, Diptera and Trichoptera were most abundant. Streams influenced by high urbanization often are dominated by Diptera or Diptera and Trichoptera and have lower Ephemeroptera (Jones and Clark 1987). Streams in the North Carolina Piedmont experience the same shift with dominant taxa being Ephemeroptera in streams influenced by forested land-use, Chironomidae in agricultural land-use, and Oligochaeta in urban land-use (Lenat and Crawford 1994).

8.1.4: EPT Percent Composition

After restoration, EPT percent composition varied across land-uses. For the development sub-watershed, there was a decrease in %Ephemeroptera, decrease in %Plecoptera, and an increase in %Trichoptera. The pond influence sub-watershed also had a decrease in %Ephemeroptera, decrease in %Plecoptera, and an increase in %Trichoptera. The mainstem influence had an increase in %Ephemeroptera, decrease in %Plecoptera, and an increase in %Trichoptera. The forested control sub-watershed had an increase in %Ephemeroptera, %Plecoptera, and a slight decrease in %Trichoptera due to accounting for the increase of other taxa. The agricultural influence sub-watershed had a decrease in all %EPT. The forested control sub-watershed was the only sub-watershed to experience an increase in %Plecoptera after restoration. Loss of stoneflies in restored reaches is most likely due to the disturbance caused by construction. As there are potentially stonefly colonists within a 5km colonization pool (Sundermann et al. 2011). in the watershed, there is strong potential for these taxa to increase over time across the watershed.

8.1.5: NCBI Bioclassification

After restoration, NCBI values increased at all sub-watersheds and most streams were bioclassified as being ‘poor’ or ‘fair’ with few to none stream sites being classified as ‘excellent.’ NCBI values respectively were lower for the forested control sub-watershed followed by the development sub-watershed, agricultural sub-watershed, and mainstem sub-watershed, and the pond-influence sub-watershed. Even though the forested control sub-watershed increased after restoration, the increase in NCBI values was minimal and C2 had a lower NCBI than C1. The initial increase in NCBI could be due to construction disturbance that comes with large restoration projects. The forested control (C2) experienced year to year variability in NCBI even without restoration and therefore restoration data should be evaluated within a fluctuating environmental context.

8.1.6: EPT Biomass

After restoration, at all sites Ephemeroptera and Trichoptera biomass increased while Plecoptera biomass decreased or became absent. Watershed urbanization can lead to nontolerant taxa, such as Plecoptera, to decrease in abundance or to be eliminated all together (Jones and Clark 1987). The development sub-watershed had an increase in Trichoptera biomass, relatively equal Ephemeroptera biomass, and there was no Plecoptera biomass before or after restoration. The forested control sub-watershed had an increase in Trichoptera and Ephemeroptera biomass with no relative change in Plecoptera biomass, indicating that the stonefly loss was most likely due to construction and not environmental effects. The agricultural sub-watershed had an increase in Trichoptera biomass, no change in Ephemeroptera biomass, and a decrease in Plecoptera biomass. The pond influence sub-watershed had an increase in Trichoptera and Ephemeroptera biomass with no relative change in Plecoptera biomass. The mainstem influence sub-watershed had an increase in Trichoptera and Ephemeroptera biomass with a decrease in Plecoptera biomass. One factor that could be contributing to the increase in Ephemeroptera and Trichoptera biomass is the absence of predators and improved habitat quality (Ahlroth et al. 2003; Lenat el al. 2017). The construction process of restoration is quite invasive to the overall stream habitat and during this time, fish or birds could have moved to other habitats that were not being impacted. It may take time for other organisms to recolonize the streams, in addition to macroinvertebrates. In addition, after restoration riparian vegetation was planted along the stream bank to provide more suitable habitat for macroinvertebrates. In theory, suitable habitat should have increased and therefore allowed for EPT biomass to increase.

Table 40. Summary of the metrics measured across all sites. An up arrow indicates there was an increase in the metric post-restoration. A down arrow indicates there was a decrease in the metric post-restoration. A red arrow indicates there was a significant difference between the measured metric post-restoration.

Site	Taxa Richness	EPT Richness	Abundance	NCBI	Biomass (E)	Biomass (P)	Biomass (T)
D2	↑	—	↑ (red)	↑	—	—	↑
D1	↑ (red)	—	↑ (red)	↑	—	—	↑
C2	—	—	—	↑	↑	↑	↑
C1	↑	↓	↑	↑	↑	↑	↑
P1	—	—	↑	↑	—	—	↑
A4	↓	↓	↑ (red)	↑ (red)	↑	↓	↑
A3	↓	↓	↑	↑ (red)	↓	↓	↑
A2	↓ (red)	↓ (red)	↑	↑	↑	↓	↓
A1	↓	↓	↑	↑	↓	↓	↑
R2	—	—	↑	↑	↑	↓	↑
R1	—	—	↑ (red)	↑	↑ (red)	↓	↑

8.2: Water Quality

For the purpose of this research study, water quality parameters were measured to provide an insight into seasonal fluctuations of macroinvertebrate community composition. The water quality parameters measured included temperature, dissolved oxygen, pH, and specific conductivity. Across the entire Reedy Creek watershed, temperature increased after restoration. Surface water temperatures increased and can be contributed to less canopy cover over the streams due to the removal of trees during construction. As canopy cover increases over time, surface water temperatures should decrease and be more similar to pre-restoration surface water temperatures.

Seasonal patterns of dissolved oxygen were consistent across the Reedy Creek watershed. Dissolved oxygen concentrations were lower in the summer than in the winter. During restoration, dissolved oxygen concentrations decreased drastically across the entire watershed which may have created stressed conditions for the macroinvertebrates. Dissolved oxygen concentrations and have gradually been increasing each sampling event and trends indicate dissolved oxygen concentrations will continue to increase.

Trends in pH varied across the sub-watersheds. In the development sub-watershed, pre-restoration pH was lower in the summer than in the winter and post-restoration pH has decreased. In the forested control sub-watershed, pre-restoration pH was higher in the summer than in the winter and post-restoration pH has decreased. In the agricultural sub-watershed, pre-restoration pH was higher in the summer than in the winter and post-restoration pH values have decreased. Even though there were fluctuations seasonally across the sub-watersheds, after restoration all sites experienced a decrease in pH indicating the water is becoming more acidic and has more free hydrogen ions.

Across all sub-watersheds, specific conductance was higher in the summer than in the winter. There is also a common pattern in which directly after restoration was completed specific conductance greatly decreased but has been gradually increasing after the initial construction.

Measuring water quality parameters are important in biological monitoring assessments as it can provide insight as to perhaps why certain taxa are not recovering after a disturbance as macroinvertebrate taxa are sensitive to a specific range of environmental parameters to survive. Increasing temperatures can allow for increased growth of plants or algae and can increase habitat complexity. Dissolved oxygen is vital for the survival of macroinvertebrates. Greater dissolved oxygen concentrations indicate more oxygen is available to macroinvertebrate taxa indicating less stress is put on the organism's chance of survival. A study performed in Colorado found similar responses as other studies in that streams with a lower pH had a lower abundance of taxa (Courtney & Clements 1998). In that study, there was significantly lower abundance of the sensitive Ephemeroptera taxa in streams that were more acidic (Courtney & Clements 1998). Previous studies have concluded that increased specific conductance may lead to water and habitat quality impairment (Roy et al. 2003). It is known that often specific conductance increases as land continues to become more urbanized due to increased sediment disturbance and runoff.

It is suggested that physical and chemical variables can influence the macroinvertebrate community's distribution, abundance, and biomass (Rivera-Usme et al. 2013). Physical and chemical variables are altered by the concentration of nutrients and contaminants which is related to discharge and the impact of increasing populations in urban areas. A study performed in an urban wetland in Colombia found a positive relationship between the specific conductance of water and biomass of macroinvertebrates belonging to the predator and detritivore functional feeding groups (Rivera-Usme et al. 2013). Since restoration construction has a more immediate impact on water quality, it is predicted that macroinvertebrates would respond to these stressors and take longer to recover.

8.3: Conclusion

For my first question, I accept the null hypothesis that restoration of an urban stream led to no significant difference in richness and NCBI. However, after restoration patterns showed that richness decreased and NCBI scores increased but there was still no significant difference before and after restoration. For my second question, I accept the null hypothesis that restoration of an urban stream had no impact on EPT biomass. However, after restoration patterns showed that Ephemeroptera and Trichoptera biomass increased and the Plecoptera biomass decreased but there was still no significant difference between before and after restoration. In the Piedmont region of North Carolina, restored urban streams had similar macroinvertebrate community composition to that of degraded urban streams with both being dissimilar from forested streams (Violin et al. 2011). Within the Reedy Creek watershed, similar patterns occurred as the forested control (C2) had overall greater richness, greater EPT percent composition, and lower NCBI in comparison to restored sites. This is indicative that the restored streams are more correlated to environmental variables of degraded urban streams and can suggest that reach-scale restoration is not successful for mitigating the impacts of urbanization on stream ecosystems (Violin et al. 2011).

After restoration, richness decreased, abundance increased, and NCBI increased. The increase in abundance shows that the Reedy Creek watershed can self-recolonize. However, it seems the abundance is increasing in tolerant taxa and decreasing in the sensitive taxa (EPT). This can be seen as NCBI values have increased and the NCBI is based on the type of taxa present and how much of that taxa is present. It is imperative to indicate that some macroinvertebrates belonging to the Plecoptera taxa are long lived species and therefore will take an estimated 2-3 years to recover after a disturbance due to their life history traits.

In macroinvertebrate literature, there is little knowledge about how long it can take the community to recover after restoration (Louhi et al. 2011; Tullos et al. 2009). The time scale of recovery can be complicated because the dispersal abilities vary among taxa. The recovery can be longer if new colonizers must come from different places. In urban streams, this can be quite difficult as urban streams are often not connected and surrounding streams are also often degraded resulting in a decreased species pool (Sundermann et al. 2011). The initial results of two-year post restoration data included in this thesis is not enough to be able to assess if restoration led to a significant difference in macroinvertebrate assemblages due to restoration (not enough replicates). When incorporating the Before-After-Control-Impact study design, there were only significant differences between the control (C2) and few sites within the development sub-watershed and the agricultural sub-watershed for abundance and NCBI. The BACI approach was designed to assess if there is a significant difference between the control location and the impact location before and after the impact occurred, regardless of environmental conditions (Underwood 1992). The restoration study at Big Spring Run had similar results when utilizing the BACI approach as it was concluded restoration had no effect on the macroinvertebrate community due to poor in-stream conditions after restoration from sediment loading (Smith et al. 2018). Conclusions made from the BACI approach can be altered by site quality and the number of sampling events (Smith et al. 2018). For Reedy Creek, there is also a great amount of variance among samples due to the time of year sampling occurred and the life stages of macroinvertebrates.

The disturbance of restoration created a 'shock to the system' in which it could take upwards of 10 years to accurately assess the outcome of the Reedy Creek Restoration Project as a success or failure. Based on what is known about the time scale of recovery after restoration, it is too early to tell and decide on the final status of this project based on these initial results. If post-restoration monitoring can continue, there is a potential to see recovery in 5 years given low percent impervious surface cover, good source of potential colonists, and the forest condition.

When designing a restoration project, if time and money are of no obligation, I would recommend that samples should be collected monthly. Especially in North Carolina we do not often have a clear summer, winter, fall, spring season. However, limiting sampling might have to be your only option due to funding. Increasing the number of samples collected would also improve statistical analyses outcomes as I often was not able to perform statistical analysis for certain sites due to a lack of replication.

It is important to emphasize the expectations for the outcomes of restoration projects need to be re-aligned. Goals of restoration projects are based upon short-term success rather than long-term longevity, which needs to change. Restoring a watershed is a great disturbance and it can take years for the ecosystem structure and function to recover. Some practitioners suggest it may take 10 years for streams to recover and improve after restoration (Lenat et al. 2017). For instance, high and low-quality streams in King County, WA are still experiencing an addition of new taxa to sites even with 20 years of monitoring data (Macneale 2020). Some practitioners even suggest due to the constraints of urban streams, that it is unlikely an urban stream can be fully restored to the pre-restoration state (Bernhard and Palmer 2007). Enabling before and after assessments with standardized methods can allow practitioners to say how ‘success’ of a stream restoration project can be achieved. The matter of fact is restoration projects are not about if you build it they will come, but is about if you build it can they come?

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APPENDIX A: MACROINVERTEBATE COMPOSITION

Appendix A1. Total species counts collected at the Reedy Creek Watershed from all sites and dates. Tolerance and abundance values are provided by published reports (NCDEQ 2016; Lenat 1993). The "N" column represents the abundance. The "A" column represents the abundance category value (1, 3, or 10) and the "T" column represents the unique tolerance value given to each species.

DATE	SITE	FAMILY	GENUS	SPECIES	N	A	T
7/28/2016	A1	HEPTAGENIIDAE	MACCAFFERTIUM	MODESTUM	3	3	5.7
7/28/2016	A1	HEPTAGENIIDAE	STENONEMA	FEMORATUM	2	1	6.9
7/28/2016	A1	LEPIDOSTOMATIDAE	LEPIDOSTOMA	SPP.	2	1	1
7/28/2016	A1	LIMNEPHILIDAE	IRONOQUIA	PUNCTACISSIMA	1	1	6.7
7/28/2016	A1	PSYCHODIDAE	PSYCHODA	SPP.	1	1	9.6
7/28/2016	A1	TABANIDAE	TABANUS	SPP.	2	1	8.5
7/28/2016	A1	AESHNIDAE	NASIAESCHNA	PENTACANTHA	2	1	6.6
7/28/2016	A1	CALOPTERYGIDAE	HETAERINA	SPP.	1	1	4.9
7/28/2016	A1	LUMBRICULIDAE			1	1	7
7/28/2016	A1	PHYSIDAE	PHYSA	SPP.	24	10	8.7
7/28/2016	A1	CORBICULIDAE	CORBICULA	FLUMINEA	3	3	6.6
7/28/2016	A2	LEPTOHYPHIDAE	HABROPHLEBIA	SPP.	3	3	0.3
7/28/2016	A2	PERLIDAE	PERLINELLA	DRYMO	2	1	1.3
7/28/2016	A2	GOERIDAE	GOERA	CALCARATA	1	1	1
7/28/2016	A2	HYDROPSYCHIDAE	CHEUMATOPSYCHE	SPP.	8	3	6.6
7/28/2016	A2	LEPIDOSTOMATIDAE	LEPIDOSTOMA	SPP.	15	10	1
7/28/2016	A2	PHRYGANEIDAE	OLIGOSTOMIS	SPP.	2	1	6.2
7/28/2016	A2	ELMIDAE	DUBIRAPHIA	SPP.	1	1	5.5
7/28/2016	A2	EMPIDIDAE	HEMERODROMIA	SPP.	4	3	7.6
7/28/2016	A2	TABANIDAE	TABANUS	SPP.	1	1	8.5
7/28/2016	A2	TIPULIDAE	PILARIA	SPP.	5	3	7
7/28/2016	A2	TIPULIDAE	TIPULA	SPP.	1	1	7.5
7/28/2016	A2	AESHNIDAE	NASIAESCHNA	PENTACANTHA	2	1	6.6
7/28/2016	A2	CALOPTERYGIDAE	HETAERINA	SPP.	2	1	4.9
7/28/2016	A2	CORDULEGASTRIDAE	CORDULEGASTER	SPP.	2	1	5.7
7/28/2016	A2	GOMPHIDAE	GOMPHUS	SPP.	3	3	5.9
7/28/2016	A2	GOMPHIDAE	PROGOMPHUS	OBSCURUS	7	3	8.2
7/28/2016	A2	LUMBRICULIDAE			7	3	7
7/28/2016	A3	HEPTAGENIIDAE	STENONEMA	FEMORATUM	1	1	6.9
7/28/2016	A3	LEPTOHYPHIDAE	HABROPHLEBIA	SPP.	1	1	0.3
7/28/2016	A3	CHLOROPERLIDAE	ALLOPERLA	SPP.	1	1	1
7/28/2016	A3	PERLIDAE	PERLINELLA	DRYMO	4	3	1.3
7/28/2016	A3	HYDROPSYCHIDAE	HYDROPSYCHE	BETTENI	1	1	7.9
7/28/2016	A3	LEPIDOSTOMATIDAE	LEPIDOSTOMA	SPP.	3	3	1

7/28/2016	A3	PHRYGANEIDAE	OLIGOSTOMIS	SPP.	2	1	6.2
7/28/2016	A3	ELMIDAE	DUBIRAPHIA	SPP.	1	1	5.5
7/28/2016	A3	EMPIDIDAE	HEMERODROMIA	SPP.	3	3	7.6
7/28/2016	A3	PSYCHODIDAE	PSYCHODA	SPP.	1	1	9.6
7/28/2016	A3	TABANIDAE	TABANUS	SPP.	28	10	8.5
7/28/2016	A3	TIPULIDAE	TIPULA	SPP.	4	3	7.5
7/28/2016	A3	CALOPTERYGIDAE	HETAERINA	SPP.	1	1	4.9
7/28/2016	A3	GOMPHIDAE	GOMPHUS	SPP.	6	3	5.9
7/28/2016	A3	GOMPHIDAE	PROGOMPHUS	OBSCURUS	6	3	8.2
7/28/2016	A3	LUMBRICULIDAE			1	1	7
7/28/2016	A3	PHYSIDAE	PHYSA	SPP.	1	1	8.7
7/28/2016	A4	LEPIDOSTOMATIDAE	LEPIDOSTOMA	SPP.	1	1	1
7/28/2016	A4	ELMIDAE	DUBIRAPHIA	SPP.	1	1	5.5
7/28/2016	A4	PSYCHODIDAE	PSYCHODA	SPP.	1	1	9.6
7/28/2016	A4	GOMPHIDAE	PROGOMPHUS	OBSCURUS	1	1	8.2
7/28/2016	A4	LUMBRICULIDAE			1	1	7
7/28/2016	A4	PHYSIDAE	PHYSA	SPP.	1	1	8.7
7/28/2016	A4	CORBICULIDAE	CORBICULA	FLUMINEA	1	1	6.6
7/28/2016	R1	BAETIDAE	BAETIS	INTERCALARIS	3	3	5
7/28/2016	R1	HEPTAGENIIDAE	MACCAFFERTIUM	MODESTUM	3	3	5.7
7/28/2016	R1	HEPTAGENIIDAE	STENONEMA	FEMORATUM	2	1	6.9
7/28/2016	R1	PHRYGANEIDAE	PTILOSTOMIS	SPP.	2	1	5.9
7/28/2016	R1	ELMIDAE	DUBIRAPHIA	SPP.	1	1	5.5
7/28/2016	R1	TABANIDAE	TABANUS	SPP.	1	1	8.5
7/28/2016	R1	TIPULIDAE	PILARIA	SPP.	1	1	7
7/28/2016	R1	AESHNIDAE	NASIAESCHNA	PENTACANTHA	6	3	6.6
7/28/2016	R1	CALOPTERYGIDAE	HETAERINA	SPP.	2	1	4.9
7/28/2016	R1	GOMPHIDAE	GOMPHUS	SPP.	2	1	5.9
7/28/2016	R1	GOMPHIDAE	PROGOMPHUS	OBSCURUS	1	1	8.2
7/28/2016	R1	LUMBRICULIDAE			5	3	7
7/28/2016	R1	PHYSIDAE	PHYSA	SPP.	3	3	8.7
7/28/2016	R2	BAETIDAE	BAETIS	INTERCALARIS	2	1	5
7/28/2016	R2	HEPTAGENIIDAE	MACCAFFERTIUM	MODESTUM	2	1	5.7
7/28/2016	R2	HYDROPSYCHIDAE	CHEUMATOPSYCHE	SPP.	4	3	6.6
7/28/2016	R2	HYDROPSYCHIDAE	DIPLECTRONA	MODESTA	3	3	2.3
7/28/2016	R2	TIPULIDAE	TIPULA	SPP.	1	1	7.5
7/28/2016	R2	AESHNIDAE	NASIAESCHNA	PENTACANTHA	13	10	6.6
7/28/2016	R2	CALOPTERYGIDAE	HETAERINA	SPP.	6	3	4.9
7/28/2016	R2	PHYSIDAE	PHYSA	SPP.	2	1	8.7
7/28/2016	P1	PHILOPOTAMIDAE	CHIMARRA	SPP.	1	1	3.3
7/28/2016	P1	TIPULIDAE	TIPULA	SPP.	1	1	7.5
7/28/2016	P1	CALOPTERYGIDAE	HETAERINA	SPP.	1	1	4.9
7/28/2016	P1	GOMPHIDAE	PROGOMPHUS	OBSCURUS	2	1	8.2

7/28/2016	P1	LUMBRICULIDAE			1	1	7
7/28/2016	P1	CORYDALIDAE	NIGRONIA	FASCIATUS	1	1	6.1
7/28/2016	P1	PHYSIDAE	PHYSA	SPP.	3	3	8.7
7/28/2016	C1	BAETIDAE	BAETIS	INTERCALARIS	1	1	5
7/28/2016	C1	PERLIDAE	PERLINELLA	DRYMO	2	1	1.3
7/28/2016	C1	HYDROPSYCHIDAE	DIPLECTRONA	MODESTA	1	1	2.3
7/28/2016	C1	HYDROPSYCHIDAE	HYDROPSYCHE	BETTENI	5	3	7.9
7/28/2016	C1	LEPIDOSTOMATIDAE	LEPIDOSTOMA	SPP.	1	1	1
7/28/2016	C1	ELMIDAE	DUBIRAPHIA	SPP.	9	3	5.5
7/28/2016	C1	PTILODACTYLIDAE	ANCHYTARUS	BICOLOR	2	1	2.4
7/28/2016	C1	EMPIDIDAE	HEMERODROMIA	SPP.	1	1	7.6
7/28/2016	C1	TIPULIDAE	PILARIA	SPP.	1	1	7
7/28/2016	C1	TIPULIDAE	TIPULA	SPP.	1	1	7.5
7/28/2016	C1	CALOPTERYGIDAE	HETAERINA	SPP.	1	1	4.9
7/28/2016	C1	PHYSIDAE	PHYSA	SPP.	24	10	8.7
7/28/2016	C1	CORBICULIDAE	CORBICULA	FLUMINEA	3	3	6.6
7/28/2016	C2	HEPTAGENIIDAE	MACCAFFERTIUM	MODESTUM	1	1	5.7
7/28/2016	C2	PERLIDAE	PERLINELLA	DRYMO	2	1	1.3
7/28/2016	C2	HYDROPSYCHIDAE	HYDROPSYCHE	BETTENI	2	1	7.9
7/28/2016	C2	LEPIDOSTOMATIDAE	LEPIDOSTOMA	SPP.	1	1	1
7/28/2016	C2	UENOIDAE	NEOPHYLAX	OLIGIUS	9	3	2.4
7/28/2016	C2	ELMIDAE	DUBIRAPHIA	SPP.	2	1	5.5
7/28/2016	C2	TIPULIDAE	TIPULA	SPP.	1	1	7.5
7/28/2016	C2	CORDULEGASTRIDAE	CORDULEGASTER	MACULATA	2	1	5.7
7/28/2016	C2	CORDULEGASTRIDAE	CORDULEGASTER	SPP.	1	1	5.7
7/28/2016	C2	GOMPHIDAE	HAGENIUS	BREVISTYLUS	1	1	4.4
7/28/2016	C2	LUMBRICULIDAE			3	3	7
7/28/2016	C2	CORBICULIDAE	CORBICULA	FLUMINEA	1	1	6.6
7/28/2016	D1	AESHNIDAE	NASIAESCHNA	PENTACANTHA	1	1	6.6
7/28/2016	D1	CALOPTERYGIDAE	HETAERINA	SPP.	1	1	4.9
7/28/2016	D1	LUMBRICULIDAE			1	1	7
7/28/2016	D2	AESHNIDAE	NASIAESCHNA	PENTACANTHA	2	1	6.6
7/28/2016	D2	CORDULEGASTRIDAE	CORDULEGASTER	MACULATA	1	1	5.7
7/28/2016	D2	GOMPHIDAE	PROGOMPHUS	OBSCURUS	1	1	8.2
7/28/2016	D2	LUMBRICULIDAE			2	1	7
7/28/2016	D2	PHYSIDAE	PHYSA	SPP.	18	10	8.7
7/28/2016	D2	PLANORBIDAE	HELISOMA	ANCEPS	1	1	6.6
7/28/2016	D2	CORBICULIDAE	CORBICULA	FLUMINEA	3	3	6.6
11/14/2016	A1	HEPTAGENIIDAE	MACCAFFERTIUM	MODESTUM	1	1	5.7
11/14/2016	A1	CAPNIIDAE	ALLOCAPNIA	SPP.	36	10	3.3
11/14/2016	A1	ELMIDAE	DUBIRAPHIA	SPP.	1	1	5.5
11/14/2016	A1	TABANIDAE	TABANUS	SPP.	1	1	8.5
11/14/2016	A1	AESHNIDAE	NASIAESCHNA	PENTACANTHA	1	1	6.6

11/14/2016	A2	EPHEMERELLIDAE	EURYLOPHELLA	DORIS	1	1	7
11/14/2016	A2	HEPTAGENIIDAE	MACCAFFERTIUM	MODESTUM	4	3	5.7
11/14/2016	A2	CAPNIIDAE	ALLOCAPNIA	SPP.	53	10	3.3
11/14/2016	A2	PERLIDAE	ECCOPTURA	XANTHENES	1	1	4.7
11/14/2016	A2	PERLIDAE	PERLINELLA	DRYMO	1	1	1.3
11/14/2016	A2	HYDROPSYCHIDAE	CHEUMATOPSYCHE	SPP.	1	1	6.6
11/14/2016	A2	HYDROPSYCHIDAE	HYDROPSYCHE	BETTENI	2	1	7.9
11/14/2016	A2	DYTISCIDAE	NEOCLYPEODYTES	SPP.	1	1	5
11/14/2016	A2	ELMIDAE	DUBIRAPHIA	SPP.	2	1	5.5
11/14/2016	A2	TABANIDAE	TABANUS	SPP.	3	3	8.5
11/14/2016	A2	TIPULIDAE	HEXATOMA	SPP.	1	1	3.5
11/14/2016	A2	TIPULIDAE	PILARIA	SPP.	16	10	7
11/14/2016	A2	TIPULIDAE	TIPULA	SPP.	3	3	7.5
11/14/2016	A2	CALOPTERYGIDAE	HETAERINA	SPP.	1	1	4.9
11/14/2016	A2	CORDULEGASTRIDAE	CORDULEGASTER	MACULATA	1	1	5.7
11/14/2016	A2	GOMPHIDAE	PROGOMPHUS	OBSCURUS	1	1	8.2
11/14/2016	A3	CAPNIIDAE	ALLOCAPNIA	SPP.	6	3	3.3
11/14/2016	A3	TABANIDAE	TABANUS	SPP.	1	1	8.5
11/14/2016	A3	TIPULIDAE	TIPULA	SPP.	3	3	7.5
11/14/2016	A4	CAPNIIDAE	ALLOCAPNIA	SPP.	3	3	3.3
11/14/2016	R1	HEPTAGENIIDAE	MACCAFFERTIUM	MODESTUM	3	3	5.7
11/14/2016	R1	CAPNIIDAE	ALLOCAPNIA	SPP.	7	3	3.3
11/14/2016	R1	HYDROPSYCHIDAE	HYDROPSYCHE	BETTENI	3	3	7.9
11/14/2016	R1	CORDULEGASTRIDAE	CORDULEGASTER	SPP.	1	1	5.7
11/14/2016	R2	PERLIDAE	PERLINELLA	DRYMO	1	1	1.3
11/14/2016	R2	PERLIDAE	PERLINELLA	EPHYRE	1	1	1.3
11/14/2016	R2	HYDROPSYCHIDAE	HYDROPSYCHE	BETTENI	3	3	7.9
11/14/2016	R2	ELMIDAE	DUBIRAPHIA	SPP.	2	1	5.5
11/14/2016	R2	TIPULIDAE	TIPULA	SPP.	1	1	7.5
11/14/2016	R2	GOMPHIDAE	OPHIOGOMPHUS	SPP.	1	1	5.9
11/16/2016	C2	EPHEMERELLIDAE	EURYLOPHELLA	DORIS	1	1	7
11/16/2016	C2	HEPTAGENIIDAE	MACCAFFERTIUM	MODESTUM	1	1	5.7
11/16/2016	C2	CAPNIIDAE	ALLOCAPNIA	SPP.	6	3	3.3
11/16/2016	C2	PERLIDAE	PERLINELLA	DRYMO	1	1	1.3
11/16/2016	C2	PERLIDAE	PERLINELLA	EPHYRE	1	1	1.3
11/16/2016	C2	HYDROPSYCHIDAE	DIPLECTRONA	MODESTA	2	1	2.3
11/16/2016	C2	HYDROPSYCHIDAE	HYDROPSYCHE	BETTENI	6	3	7.9
11/16/2016	C2	LIMNEPHILIDAE	PYCNOPSYCHE	SCABRIPENNIS	1	1	2.5
11/16/2016	C2	ELMIDAE	DUBIRAPHIA	SPP.	32	10	5.5
11/16/2016	C2	PTILODACTYLIDAE	ECTOPRIA	NERVOSA	3	3	2.4
11/16/2016	C2	PSEPHENIDAE	PSEPHENUS	HERRICKI	1	1	2.3
11/16/2016	C2	TIPULIDAE	TIPULA	SPP.	1	1	7.5
11/16/2016	D1	TIPULIDAE	TIPULA	SPP.	3	3	7.5

11/16/2016	D1	LUMBRICULIDAE			2	1	7
11/16/2016	D2	DYTISCIDAE	NEOCLYPEODYTES	SPP.	1	1	5
11/16/2016	D2	PSEPHENIDAE	PSEPHENUS	HERRICKI	1	1	2.3
11/16/2016	D2	TIPULIDAE	TIPULA	SPP.	3	3	7.5
11/16/2016	P1	TIPULIDAE	TIPULA	SPP.	1	1	7.5
11/16/2016	P1	CALOPTERYGIDAE	HETAERINA	SPP.	1	1	4.9
11/16/2016	P1	GOMPHIDAE	PROGOMPHUS	OBSCURUS	1	1	8.2
3/17/2017	A1	BAETIDAE	BAETIS	INTERCALARIS	9	3	5
3/17/2017	A1	BAETIDAE	BAETIS	SPP.	294	10	5
3/17/2017	A1	EPHEMERELLIDAE	EPHEMERELLA	DOROTHEA	74	10	3.3
3/17/2017	A1	HEPTAGENIIDAE	MACCAFFERTIUM	MODESTUM	2	1	5.7
3/17/2017	A1	CHLOROPERLIDAE	ALLOPERLA	SPP.	28	10	1
3/17/2017	A1	NEMOURIDAE	APHINEMURA	SPP.	21	10	3.8
3/17/2017	A1	PERLODIDAE	ISOPERLA	TRANSMARINA	30	10	4.8
3/17/2017	A1	LIMNEPHILIDAE	IRONOQUIA	PUNCTACISSIMA	2	1	6.7
3/17/2017	A1	UENOIDAE	NEOPHYLAX	OLIGIUS	1	1	2.4
3/17/2017	A1	DYTISCIDAE	NEOCLYPEODYTES	SPP.	7	3	5
3/17/2017	A1	ELMIDAE	DUBIRAPHIA	SPP.	1	1	5.5
3/17/2017	A1	CHIRONOMIDAE			97	10	7
3/17/2017	A1	EMPIDIDAE	HEMERODROMIA	SPP.	1	1	7.6
3/17/2017	A1	EPHYDRIDAE	EPHYDRA	SPP.	17	10	8
3/17/2017	A1	SIMULIIDAE	PROSIMULIUM	SPP.	1	1	4.5
3/17/2017	A1	TABANIDAE	TABANUS	SPP.	4	3	8.5
3/17/2017	A1	TIPULIDAE	PILARIA	SPP.	5	3	7
3/17/2017	A1	TIPULIDAE	TIPULA	SPP.	1	1	7.5
3/17/2017	A1	AESHNIDAE	BOYERIA	GRAFIANA	1	1	3.8
3/17/2017	A1	AESHNIDAE	NASIAESCHNA	PENTACANTHA	2	1	6.6
3/17/2017	A1	CALOPTERYGIDAE	CALOPTERYX	SPP.	1	1	7.5
3/17/2017	A1	CORDULEGASTRIDAE	CORDULEGASTER	SPP.	1	1	5.7
3/17/2017	A1	GOMPHIDAE	PROGOMPHUS	OBSCURUS	6	3	8.2
3/17/2017	A2	BAETIDAE	BAETIS	INTERCALARIS	4	3	5
3/17/2017	A2	EPHEMERELLIDAE	EPHEMERELLA	DOROTHEA	1	1	3.3
3/17/2017	A2	HEPTAGENIIDAE	MACCAFFERTIUM	MODESTUM	1	1	5.7
3/17/2017	A2	CHLOROPERLIDAE	ALLOPERLA	SPP.	8	3	1
3/17/2017	A2	NEMOURIDAE	APHINEMURA	SPP.	1	1	3.8
3/17/2017	A2	LEPIDOSTOMATIDAE	LEPIDOSTOMA	SPP.	1	1	3
3/17/2017	A2	UENOIDAE	NEOPHYLAX	OLIGIUS	20	10	2.4
3/17/2017	A2	DYTISCIDAE	NEOCLYPEODYTES	SPP.	1	1	5
3/17/2017	A2	CHRYSOMELIDAE	DONACIA	SPP.	1	1	5
3/17/2017	A2	CHIRONOMIDAE			17	10	7
3/17/2017	A2	TABANIDAE	TABANUS	SPP.	8	3	8.5
3/17/2017	A2	TIPULIDAE	HEXATOMA	SPP.	1	1	3.5
3/17/2017	A2	TIPULIDAE	PILARIA	SPP.	17	10	7

3/17/2017	A2	TIPULIDAE	TIPULA	SPP.	3	3	7.5
3/17/2017	A2	CORDULEGASTRIDAE	CORDULEGASTER	MACULATA	1	1	5.7
3/17/2017	A2	GOMPHIDAE	PROGOMPHUS	OBSCURUS	6	3	8.2
3/17/2017	A2	PHYSIDAE	PHYSA	SPP.	1	1	8.7
3/17/2017	A3	BAETIDAE	BAETIS	INTERCALARIS	4	3	5
3/17/2017	A3	EPHEMERELLIDAE	EPHEMERELLA	DOROTHEA	4	3	3.3
3/17/2017	A3	HEPTAGENIIDAE	MACCAFFERTIUM	MODESTUM	1	1	5.7
3/17/2017	A3	CHLOROPERLIDAE	ALLOPERLA	SPP.	8	3	1
3/17/2017	A3	NEMOURIDAE	APHINEMURA	SPP.	1	1	3.8
3/17/2017	A3	PERLODIDAE	DIPLOPERLA	DUPLICATA	1	1	2.8
3/17/2017	A3	LEPIDOSTOMATIDAE	LEPIDOSTOMA	SPP.	1	1	1
3/17/2017	A3	UENOIDAE	NEOPHYLAX	OLIGIUS	15	10	2.4
3/17/2017	A3	DYTISCIDAE	NEOCLYPEODYTES	SPP.	2	1	5
3/17/2017	A3	CHIRONOMIDAE			12	10	7
3/17/2017	A3	EPHYDRIDAE	EPHYDRA	SPP.	2	1	8
3/17/2017	A3	TIPULIDAE	TIPULA	SPP.	2	1	7.5
3/17/2017	A3	CALOPTERYGIDAE	CALOPTERYX	SPP.	1	1	7.5
3/17/2017	A3	CORDULEGASTRIDAE	CORDULEGASTER	SPP.	1	1	5.7
3/17/2017	A4	BAETIDAE	BAETIS	INTERCALARIS	3	3	5
3/17/2017	A4	EPHEMERELLIDAE	EPHEMERELLA	DOROTHEA	1	1	3.3
3/17/2017	A4	CHLOROPERLIDAE	ALLOPERLA	SPP.	1	1	1
3/17/2017	A4	NEMOURIDAE	APHINEMURA	SPP.	15	10	3.8
3/17/2017	A4	PERLODIDAE	ISOPERLA	TRANSMARINA	5	3	4.8
3/17/2017	A4	HYDROPSYCHIDAE	CHEUMATOPSYCHE	SPP.	1	1	6.6
3/17/2017	A4	HYDROPSYCHIDAE	HYDROPSYCHE	BETTENI	1	1	7.9
3/17/2017	A4	UENOIDAE	NEOPHYLAX	OLIGIUS	20	10	2.4
3/17/2017	A4	DYTISCIDAE	NEOCLYPEODYTES	SPP.	6	3	5
3/17/2017	A4	CHIRONOMIDAE			4	3	7
3/17/2017	A4	SCATHOPHAGIDAE	ACANTHOCNEMA	SPP.	1	1	6
3/17/2017	A4	CALOPTERYGIDAE	CALOPTERYX	SPP.	1	1	7.5
3/17/2017	A4	HAPLOTAXIDAE	HAPLOTAXIS	GORDIOIDES	1	1	3.6
3/17/2017	C1	EPHEMERELLIDAE	EPHEMERELLA	DOROTHEA	1	1	3.3
3/17/2017	C1	HEPTAGENIIDAE	MACCAFFERTIUM	MODESTUM	2	1	5.7
3/17/2017	C1	PERLIDAE	PERLINELLA	DRYMO	2	1	1.3
3/17/2017	C1	CALAMOCERATIDAE	ANISOCENTROPUS	PYRALOIDES	1	1	1.3
3/17/2017	C1	UENOIDAE	NEOPHYLAX	OLIGIUS	29	10	2.4
3/17/2017	C1	CHIRONOMIDAE			20	10	7
3/17/2017	C1	EPHYDRIDAE	EPHYDRA	SPP.	1	1	8
3/17/2017	C2	BAETIDAE	BAETIS	INTERCALARIS	1	1	5
3/17/2017	C2	EPHEMERELLIDAE	DANNELLA	SIMPLEX	2	1	3.4
3/17/2017	C2	EPHEMERELLIDAE	EPHEMERELLA	DOROTHEA	2	1	3.3
3/17/2017	C2	HEPTAGENIIDAE	MACCAFFERTIUM	MODESTUM	2	1	5.7
3/17/2017	C2	CHLOROPERLIDAE	ALLOPERLA	SPP.	1	1	1

3/17/2017	C2	PERLIDAE	PERLINELLA	DRYMO	2	1	1.3
3/17/2017	C2	NEMOURIDAE	APHINEMURA	SPP.	1	1	3.8
3/17/2017	C2	HYDROPSYCHIDAE	CHEUMATOPSYCHE	SPP.	2	1	6.6
3/17/2017	C2	LEPIDOSTOMATIDAE	LEPIDOSTOMA	SPP.	1	1	1
3/17/2017	C2	UENOIDAE	NEOPHYLAX	OLIGIUS	37	10	2.4
3/17/2017	C2	ELMIDAE	DUBIRAPHIA	SPP.	5	3	5.5
3/17/2017	C2	PTILODACTYLIDAE	ANCHYTARUS	BICOLOR	5	3	2.4
3/17/2017	C2	PSEPHENIDAE	ECTOPRIA	NERVOSA	1	1	4.3
3/17/2017	C2	PSEPHENIDAE	PSEPHENUS	HERRICKI	1	1	2.3
3/17/2017	C2	CHIRONOMIDAE			9	3	7
3/17/2017	C2	TABANIDAE	TABANUS	SPP.	4	3	8.5
3/17/2017	C2	TIPULIDAE	PILARIA	SPP.	2	1	7
3/17/2017	C2	CALOPTERYGIDAE	CALOPTERYX	SPP.	1	1	7.5
3/17/2017	C2	CORDULEGASTRIDAE	CORDULEGASTER	SPP.	1	1	5.7
3/17/2017	D2	HEPTAGENIIDAE	MACCAFFERTIUM	MODESTUM	2	1	5.7
3/17/2017	D2	LEPIDOSTOMATIDAE	LEPIDOSTOMA	SPP.	1	1	1
3/17/2017	D2	UENOIDAE	NEOPHYLAX	OLIGIUS	10	10	2.4
3/17/2017	D2	ELMIDAE	DUBIRAPHIA	SPP.	1	1	5.5
3/17/2017	D2	CHIRONOMIDAE			3	3	7
3/17/2017	D2	EPHYDRIDAE	EPHYDRA	SPP.	1	1	8
3/17/2017	R1	BAETIDAE	BAETIS	INTERCALARIS	16	10	5
3/17/2017	R1	EPHEMERELLIDAE	EPHEMERELLA	DOROTHEA	2	1	3.3
3/17/2017	R1	HEPTAGENIIDAE	MACCAFFERTIUM	MODESTUM	1	1	5.7
3/17/2017	R1	PERLIDAE	PERLINELLA	DRYMO	1	1	1.3
3/17/2017	R1	NEMOURIDAE	APHINEMURA	SPP.	1	1	3.8
3/17/2017	R1	UENOIDAE	NEOPHYLAX	OLIGIUS	3	3	2.4
3/17/2017	R1	CHIRONOMIDAE			2	1	7
3/17/2017	R1	GOMPHIDAE	PROGOMPHUS	OBSCURUS	1	1	8.2
3/17/2017	R2	BAETIDAE	BAETIS	INTERCALARIS	2	1	5
3/17/2017	R2	EPHEMERELLIDAE	EPHEMERELLA	DOROTHEA	5	3	3.3
3/17/2017	R2	HEPTAGENIIDAE	MACCAFFERTIUM	MODESTUM	4	3	5.7
3/17/2017	R2	HYDROPSYCHIDAE	CHEUMATOPSYCHE	SPP.	1	1	6.6
3/17/2017	R2	CHIRONOMIDAE			8	3	7
3/17/2017	R2	CALOPTERYGIDAE	CALOPTERYX	SPP.	1	1	7.5
3/17/2017	R2	GOMPHIDAE	PROGOMPHUS	OBSCURUS	2	1	8.2
3/17/2017	P1	HEPTAGENIIDAE	MACCAFFERTIUM	MODESTUM	1	1	5.7
3/17/2017	P1	DYTISCIDAE	NEOCLYPEODYTES	SPP.	1	1	5
3/17/2017	P1	ELMIDAE	DUBIRAPHIA	SPP.	1	1	5.5
3/17/2017	P1	CHIRONOMIDAE			5	3	7
3/17/2017	P1	CALOPTERYGIDAE	CALOPTERYX	SPP.	1	1	7.5
3/17/2017	P1	GOMPHIDAE	PROGOMPHUS	OBSCURUS	3	3	8.2
3/17/2017	P1	HAPLOTAXIDAE	HAPLOTAXIS	GORDIOIDES	1	1	3.6
6/20/2017	A1	LIMNEPHILIDAE	IRONOQUIA	PUNCTACISSIMA	1	1	6.7

6/20/2017	A1	ELMIDAE	DUBIRAPHIA	SPP.	1	1	5.5
6/20/2017	A1	TABANIDAE	TABANUS	SPP.	1	1	8.5
6/20/2017	A1	TIPULIDAE	PILARIA	SPP.	2	1	7
6/20/2017	A1	AESHNIDAE	BOYERIA	GRAFIANA	3	3	3.8
6/20/2017	A1	CORDULEGASTRIDAE	CORDULEGASTER	SPP.	3	3	5.7
6/20/2017	A1	GOMPHIDAE	PROGOMPHUS	OBSCURUS	1	1	8.2
6/20/2017	A2	CHIRONOMIDAE			2	1	7
6/20/2017	A2	TABANIDAE	TABANUS	SPP.	1	1	8.5
6/20/2017	A2	TIPULIDAE	TIPULA	SPP.	1	1	7.5
6/20/2017	A3	HEPTAGENIIDAE	MACCAFFERTIUM	MODESTUM	1	1	5.7
6/20/2017	A3	PERLIDAE	PERLINELLA	DRYMO	1	1	1.3
6/20/2017	A3	HYDROPSYCHIDAE	CHEUMATOPSYCHE	SPP.	1	1	6.6
6/20/2017	A3	HYDROPSYCHIDAE	HYDROPSYCHE	BETTENI	1	1	7.9
6/20/2017	A3	UENOIDAE	NEOPHYLAX	OLIGIUS	21	10	2.4
6/20/2017	A3	ELMIDAE	DUBIRAPHIA	SPP.	1	1	5.5
6/20/2017	A3	CHIRONOMIDAE			3	3	7
6/20/2017	A3	TIPULIDAE	TIPULA	SPP.	2	1	7.5
6/20/2017	A3	AESHNIDAE	BOYERIA	GRAFIANA	2	1	3.8
6/20/2017	A3	AESHNIDAE	NASIAESCHNA	PENTACANTHA	1	1	6.6
6/20/2017	A4	HYDROPSYCHIDAE	HYDROPSYCHE	BETTENI	1	1	7.9
6/20/2017	A4	UENOIDAE	NEOPHYLAX	OLIGIUS	26	10	2.4
6/20/2017	A4	TABANIDAE	TABANUS	SPP.	1	1	8.5
6/21/2017	C2	HEPTAGENIIDAE	MACCAFFERTIUM	MODESTUM	12	10	5.7
6/21/2017	C2	PERLIDAE	PERLINELLA	DRYMO	3	3	1.3
6/21/2017	C2	HYDROPSYCHIDAE	DIPLECTRONA	MODESTA	30	10	2.3
6/21/2017	C2	ODONTOCERIDAE	PSILOTRETA	SPP.	3	3	0.5
6/21/2017	C2	UENOIDAE	NEOPHYLAX	OLIGIUS	18	10	2.4
6/21/2017	C2	ELMIDAE	DUBIRAPHIA	SPP.	2	1	5.5
6/21/2017	C2	PTILODACTYLIDAE	ANCHYTARUS	BICOLOR	1	1	2.4
6/21/2017	C2	PSEPHENIDAE	ECTOPRIA	NERVOSA	1	1	4.3
6/21/2017	C2	PSEPHENIDAE	PSEPHENUS	HERRICKI	9	3	2.3
6/21/2017	C2	CHIRONOMIDAE			3	3	7
6/21/2017	C2	TABANIDAE	TABANUS	SPP.	1	1	8.5
6/21/2017	C2	TIPULIDAE	TIPULA	SPP.	6	3	7.5
6/21/2017	C2	CORDULEGASTRIDAE	CORDULEGASTER	SPP.	1	1	5.7
6/21/2017	C2	GOMPHIDAE	PROGOMPHUS	OBSCURUS	1	1	8.2
6/21/2017	D1	BAETIDAE	BAETIS	SPP.	1	1	5
6/21/2017	D1	HEPTAGENIIDAE	MACCAFFERTIUM	MODESTUM	1	1	5.7
6/21/2017	D1	HYDROPSYCHIDAE	HYDROPSYCHE	BETTENI	8	3	7.5
6/21/2017	D1	UENOIDAE	NEOPHYLAX	OLIGIUS	1	1	2.4
6/21/2017	D1	HALIPIDAE			1	1	7
6/21/2017	D1	CHIRONOMIDAE			1	1	7
6/21/2017	D2	HEPTAGENIIDAE	MACCAFFERTIUM	MODESTUM	6	3	5.7

6/21/2017	D2	HYDROPSYCHIDAE	CHEUMATOPSYCHE	SPP.	7	3	6.6
6/21/2017	D2	HYDROPSYCHIDAE	HYDROPSYCHE	BETTENI	5	3	7.9
6/21/2017	D2	UENOIDAE	NEOPHYLAX	OLIGIUS	1	1	2.4
6/21/2017	D2	ELMIDAE	DUBIRAPHIA	SPP.	3	3	5.5
6/21/2017	D2	TABANIDAE	TABANUS	SPP.	1	1	8.5
6/21/2017	D2	TIPULIDAE	HEXATOMA	SPP.	1	1	3.5
6/21/2017	D2	TIPULIDAE	TIPULA	SPP.	2	1	7.5
6/21/2017	D2	GOMPHIDAE	PROGOMPHUS	OBSCURUS	2	1	8.2
6/20/2017	R1	HEPTAGENIIDAE	MACCAFFERTIUM	MODESTUM	1	1	5.7
6/20/2017	R1	HYDROPSYCHIDAE	CHEUMATOPSYCHE	SPP.	2	1	6.6
6/20/2017	R1	HYDROPSYCHIDAE	HYDROPSYCHE	BETTENI	1	1	7.9
6/20/2017	R1	ELMIDAE	DUBIRAPHIA	SPP.	1	1	5.5
6/20/2017	R1	STRATIOMYIDAE	OXYCERA	SPP.	1	1	7
6/20/2017	R1	AESHNIDAE	NASIAESCHNA	PENTACANTHA	3	3	6.6
6/20/2017	R1	GOMPHIDAE	OPHIOGOMPHUS	SPP.	1	1	5.9
6/20/2017	R2	HYDROPSYCHIDAE	HYDROPSYCHE	BETTENI	3	3	7.9
6/20/2017	R2	CHIRONOMIDAE			8	3	7
6/20/2017	R2	TIPULIDAE	TIPULA	SPP.	1	1	7.5
6/20/2017	R2	CORDULEGASTRIDAE	CORDULEGASTER	SPP.	1	1	5.7
6/20/2017	R2	HAPLOTAXIDAE	HAPLOTAXIS	GORDIOIDES	1	1	3.6
6/20/2017	P1	HEPTAGENIIDAE	MACCAFFERTIUM	MODESTUM	5	3	5.7
6/20/2017	P1	HYDROPSYCHIDAE	CHEUMATOPSYCHE	SPP.	18	10	6.6
6/20/2017	P1	HYDROPSYCHIDAE	HYDROPSYCHE	BETTENI	1	1	7.9
6/20/2017	P1	PHRYGANEIDAE	OLIGOSTOMIS	SPP.	1	1	6.2
6/20/2017	P1	UENOIDAE	NEOPHYLAX	OLIGIUS	3	3	2.4
6/20/2017	P1	CHIRONOMIDAE			1	1	7
6/20/2017	P1	AESHNIDAE	BOYERIA	GRAFIANA	1	1	3.8
6/20/2017	P1	CALOPTERYGIDAE	CALOPTERYX	SPP.	2	1	7.5
6/20/2017	P1	CORDULEGASTRIDAE	CORDULEGASTER	SPP.	2	1	5.7
6/20/2017	P1	GOMPHIDAE	PROGOMPHUS	OBSCURUS	5	3	8.2
10/18/2017	A1	BAETIDAE	BAETIS	SPP.	3	3	5
10/18/2017	A1	HEPTAGENIIDAE	MACCAFFERTIUM	MODESTUM	7	3	5.7
10/18/2017	A1	HYDROPSYCHIDAE	CHEUMATOPSYCHE	SPP.	4	3	6.6
10/18/2017	A1	CHIRONOMIDAE			17	10	7
10/18/2017	A1	TABANIDAE	TABANUS	SPP.	1	1	8.5
10/18/2017	A1	TIPULIDAE	TIPULA	SPP.	6	3	7.5
10/18/2017	A1	AESHNIDAE	BOYERIA	GRAFIANA	1	1	3.8
10/18/2017	A1	CALOPTERYGIDAE	CALOPTERYX	SPP.	2	1	7.5
10/18/2017	A1	PSYCHODIDAE	PSYCHODA	SPP.	3	3	9.6
10/18/2017	A1	CORDULEGASTRIDAE	CORDULEGASTER	SPP.	5	3	5.7
10/18/2017	A1	GOMPHIDAE	PROGOMPHUS	OBSCURUS	8	3	8.2
10/18/2017	A1	PHYSIDAE	PHYSA	SPP.	3	3	8.7
10/18/2017	A2	HEPTAGENIIDAE	MACCAFFERTIUM	MODESTUM	9	3	5.7

10/18/2017	A2	DYTISCIDAE	NEOCLYPEODYTES	SPP.	1	1	5
10/18/2017	A2	TABANIDAE	TABANUS	SPP.	2	1	8.5
10/18/2017	A2	TIPULIDAE	TIPULA	SPP.	2	1	7.5
10/18/2017	A2	GOMPHIDAE	PROGOMPHUS	OBSCURUS	6	3	8.2
10/18/2017	A2	PHYSIDAE	PHYSA	SPP.	32	10	8.7
10/18/2017	A2	CHIRONOMIDAE			1	1	7
10/18/2017	A3	UENOIDAE	NEOPHYLAX	OLIGIUS	6	3	2.4
10/18/2017	A3	DYTISCIDAE	NEOCLYPEODYTES	SPP.	1	1	5
10/18/2017	A3	PSEPHENIDAE	ECTOPRIA	NERVOSA	1	1	4.3
10/18/2017	A3	TABANIDAE	TABANUS	SPP.	2	1	8.5
10/18/2017	A3	TIPULIDAE	TIPULA	SPP.	2	1	7.5
10/18/2017	A3	AESHNIDAE	BOYERIA	GRAFIANA	1	1	3.8
10/18/2017	A3	CORDULEGASTRIDAE	CORDULEGASTER	SPP.	3	3	5.7
10/18/2017	A3	GOMPHIDAE	PROGOMPHUS	OBSCURUS	9	3	8.2
10/18/2017	A4	HYDROPSYCHIDAE	DIPLECTRONA	MODESTA	1	1	2.3
10/18/2017	A4	UENOIDAE	NEOPHYLAX	OLIGIUS	11	10	2.4
10/18/2017	A4	PLANORBIDAE	HELISOMA	ANCEPS	1	1	6.6
10/19/2017	C2	HEPTAGENIIDAE	MACCAFFERTIUM	MODESTUM	2	1	5.7
10/19/2017	C2	PERLIDAE	PERLINELLA	DRYMO	1	1	1.3
10/19/2017	C2	HYDROPSYCHIDAE	DIPLECTRONA	MODESTA	2	1	2.3
10/19/2017	C2	LEPIDOSTOMATIDAE	LEPIDOSTOMA	SPP.	2	1	1
10/19/2017	C2	DYTISCIDAE	NEOCLYPEODYTES	SPP.	1	1	5
10/19/2017	C2	PSEPHENIDAE	PSEPHENUS	HERRICKI	1	1	2.3
10/19/2017	C2	CHIRONOMIDAE			3	3	7
10/19/2017	C2	TABANIDAE	TABANUS	SPP.	2	1	8.5
10/19/2017	C2	TIPULIDAE	TIPULA	SPP.	42	10	7.5
10/19/2017	C2	CORDULEGASTRIDAE	CORDULEGASTER	SPP.	5	3	5.7
10/19/2017	C2	GOMPHIDAE	PROGOMPHUS	OBSCURUS	1	1	8.2
10/19/2017	D1	HEPTAGENIIDAE	MACCAFFERTIUM	MODESTUM	2	1	5.7
10/19/2017	D1	HYDROPSYCHIDAE	CHEUMATOPSYCHE	SPP.	10	10	6.6
10/19/2017	D1	CHIRONOMIDAE			4	3	7
10/19/2017	D1	PSYCHODIDAE	PSYCHODA	SPP.	1	1	9.6
10/19/2017	D1	TIPULIDAE	TIPULA	SPP.	5	3	7.5
10/19/2017	D1	PHYSIDAE	PHYSA	SPP.	1	1	8.7
10/19/2017	D2	PHILOPOTAMIDAE	CHIMARRA	SPP.	1	1	3.3
10/19/2017	D2	UENOIDAE	NEOPHYLAX	OLIGIUS	3	3	2.4
10/19/2017	D2	DYTISCIDAE	NEOCLYPEODYTES	SPP.	6	3	5
10/19/2017	D2	CHIRONOMIDAE			22	10	7
10/19/2017	D2	TABANIDAE	TABANUS	SPP.	1	1	8.5
10/19/2017	D2	AESHNIDAE	BOYERIA	GRAFIANA	2	1	3.8
10/19/2017	D2	CALOPTERYGIDAE	CALOPTERYX	SPP.	1	1	7.5
10/19/2017	D2	GOMPHIDAE	PROGOMPHUS	OBSCURUS	1	1	8.2
10/19/2017	D2	PHYSIDAE	PHYSA	SPP.	2	1	8.7

10/19/2017	P1	CORDULEGASTRIDAE	CORDULEGASTER	SPP.	1	1	5.7
10/19/2017	P1	GOMPHIDAE	PROGOMPHUS	OBSCURUS	3	3	8.2
10/18/2017	R1	HEPTAGENIIDAE	MACCAFFERTIUM	MODESTUM	4	3	5.7
10/18/2017	R1	CHIRONOMIDAE			4	3	7
10/18/2017	R1	PSYCHODIDAE	TELMATOSCOPUS	SPP.	1	1	8
10/18/2017	R1	TIPULIDAE	TIPULA	SPP.	18	10	7.5
10/18/2017	R1	AESHNIDAE	BOYERIA	GRAFIANA	2	1	3.8
10/18/2017	R1	CALOPTERYGIDAE	CALOPTERYX	SPP.	4	3	7.5
10/18/2017	R1	GOMPHIDAE	PROGOMPHUS	OBSCURUS	2	1	8.2
10/18/2017	R2	BAETIDAE	BAETIS	SPP.	9	3	5
10/18/2017	R2	HEPTAGENIIDAE	MACCAFFERTIUM	MODESTUM	14	10	5.7
10/18/2017	R2	HYDROPSYCHIDAE	CHEUMATOPSYCHE	SPP.	23	10	6.6
10/18/2017	R2	PHILOPOTAMIDAE	CHIMARRA	SPP.	3	3	3.3
10/18/2017	R2	ELMIDAE	DUBIRAPHIA	SPP.	4	3	5.5
10/18/2017	R2	CHIRONOMIDAE			4	3	7
10/18/2017	R2	SIMULIIDAE	CNEPHIA	ORNITHOPHILA	1	1	4
10/18/2017	R2	TIPULIDAE	TIPULA	SPP.	10	10	7.5
10/18/2017	R2	AESHNIDAE	BOYERIA	GRAFIANA	2	1	3.8
10/18/2017	R2	CALOPTERYGIDAE	CALOPTERYX	SPP.	11	10	7.5
10/18/2017	R2	GOMPHIDAE	PROGOMPHUS	OBSCURUS	3	3	8.2
2/18/2018	A1	EPHEMERELLIDAE	EPHEMERELLA	DOROTHEA	2	1	3.3
2/18/2018	A1	HEPTAGENIIDAE	MACCAFFERTIUM	MODESTUM	2	1	5.7
2/18/2018	A1	HYDROPSYCHIDAE	CHEUMATOPSYCHE	SPP.	1	1	6.6
2/18/2018	A1	LIMNEPHILIDAE	IRONOQUIA	PUNCTACISSIMA	1	1	6.7
2/18/2018	A1	DYTISCIDAE	NEOCLYPEODYTES	SPP.	1	1	5
2/18/2018	A1	CALOPTERYGIDAE	CALOPTERYX	SPP.	1	1	7.5
2/18/2018	A1	PHYSIDAE	PHYSA	SPP.	5	3	8.7
2/18/2018	A3	EPHEMERELLIDAE	EPHEMERELLA	DOROTHEA	23	10	3.3
2/18/2018	A3	HEPTAGENIIDAE	MACCAFFERTIUM	MODESTUM	2	1	5.7
2/18/2018	A3	LEPIDOSTOMATIDAE	LEPIDOSTOMA	SPP.	1	1	1
2/18/2018	A3	LIMNEPHILIDAE	PYCNOPSYCHE	SCABRIPENNIS	1	1	2.5
2/18/2018	A3	PHILOPOTAMIDAE	CHIMARRA	SPP.	5	3	3.3
2/18/2018	A3	UENOIDAE	NEOPHYLAX	OLIGIUS	2	1	2.4
2/18/2018	A3	DYTISCIDAE	NEOCLYPEODYTES	SPP.	2	1	5
2/18/2018	A3	PSYCHODIDAE	PSYCHODA	SPP.	1	1	9.6
2/18/2018	A3	SIMULIIDAE	PROSIMULIUM	SPP.	1	1	4.5
2/18/2018	A3	TIPULIDAE	TIPULA	SPP.	1	1	7.5
2/18/2018	A3	TIPULIDAE	HEXATOMA	SPP.	1	1	3.5
2/18/2018	A3	AESHNIDAE	BOYERIA	GRAFIANA	1	1	3.8
2/18/2018	A3	CALOPTERYGIDAE	CALOPTERYX	SPP.	4	3	7.5
2/18/2018	A4	LIMNEPHILIDAE	IRONOQUIA	PUNCTACISSIMA	1	1	6.7
2/18/2018	A4	UENOIDAE	NEOPHYLAX	OLIGIUS	10	10	2.4
2/18/2018	A4	TIPULIDAE	TIPULA	SPP.	3	3	7.5

2/18/2018	C2	EPHEMERELLIDAE	DANNELLA	SIMPLEX	4	3	3.4
2/18/2018	C2	HEPTAGENIIDAE	MACCAFFERTIUM	MODESTUM	10	10	5.7
2/18/2018	C2	PERLIDAE	ECCOPTURA	XANTHENES	2	1	4.7
2/18/2018	C2	CALAMOCERATIDAE	ANISOCENTROPUS	PYRALOIDES	1	1	1.3
2/18/2018	C2	HYDROPSYCHIDAE	DIPLECTRONA	MODESTA	3	3	2.3
2/18/2018	C2	LEPIDOSTOMATIDAE	LEPIDOSTOMA	SPP.	9	3	1
2/18/2018	C2	LIMNEPHILIDAE	PYCNOPSYCHE	SCABRIPENNIS	3	3	2.5
2/18/2018	C2	RHYACOPHILIDAE	RHYACOPHILA	SPP.	2	1	0.4
2/18/2018	C2	DYTISCIDAE	NEOCLYPEODYTES	SPP.	7	3	5
2/18/2018	C2	ELMIDAE	DUBIRAPHIA	SPP.	1	1	5.5
2/18/2018	C2	PSEPHENIDAE	ECTOPRIA	NERVOSA	1	1	4.3
2/18/2018	C2	PSEPHENIDAE	PSEPHENUS	HERRICKI	1	1	2.3
2/18/2018	C2	CHIRONOMIDAE			1	1	7
2/18/2018	C2	TABANIDAE	TABANUS	SPP.	2	1	8.5
2/18/2018	C2	TIPULIDAE	TIPULA	SPP.	3	3	7.5
2/18/2018	C2	GOMPHIDAE	PROGOMPHUS	OBSCURUS	1	1	8.2
2/18/2018	R1	HEPTAGENIIDAE	MACCAFFERTIUM	MODESTUM	6	3	5.7
2/18/2018	R1	CHIRONOMIDAE			1	1	7
2/18/2018	R1	TIPULIDAE	TIPULA	SPP.	2	1	7.5
2/18/2018	R1	CALOPTERYGIDAE	CALOPTERYX	SPP.	1	1	7.5
2/18/2018	R2	EPHEMERELLIDAE	EPHEMERELLA	DOROTHEA	1	1	3.3
2/18/2018	R2	HEPTAGENIIDAE	MACCAFFERTIUM	MODESTUM	7	3	5.7
2/18/2018	R2	HYDROPSYCHIDAE	CHEUMATOPSYCHE	SPP.	2	1	6.6
2/18/2018	R2	HYDROPSYCHIDAE	DIPLECTRONA	MODESTA	1	1	2.3
2/18/2018	R2	LEPIDOSTOMATIDAE	LEPIDOSTOMA	SPP.	1	1	1
2/18/2018	R2	CHIRONOMIDAE			14	10	7
2/18/2018	R2	SIMULIIDAE	CNEPHIA	ORNITHOPHILA	1	1	4
2/18/2018	R2	TIPULIDAE	TIPULA	SPP.	4	3	7.5
2/18/2018	R2	AESHNIDAE	BOYERIA	GRAFIANA	1	1	3.8
2/18/2018	R2	CALOPTERYGIDAE	CALOPTERYX	SPP.	2	1	7.5
2/18/2018	P1	BAETIDAE	BAETIS	SPP.	1	1	5
2/18/2018	P1	HEPTAGENIIDAE	MACCAFFERTIUM	MODESTUM	3	3	5.7
2/18/2018	P1	HYDROPSYCHIDAE	DIPLECTRONA	MODESTA	2	1	2.3
2/18/2018	P1	LIMNEPHILIDAE	PYCNOPSYCHE	SCABRIPENNIS	4	3	2.5
2/18/2018	P1	DYTISCIDAE	NEOCLYPEODYTES	SPP.	1	1	5
2/18/2018	P1	CHIRONOMIDAE			2	1	7
2/18/2018	P1	CALOPTERYGIDAE	CALOPTERYX	SPP.	1	1	7.5
2/18/2018	P1	CORDULEGASTRIDAE	CORDULEGASTER	SPP.	2	1	5.7
2/18/2018	P1	PHYSIDAE	PHYSA	SPP.	3	3	8.7
8/17/2018	A2	DYTISCIDAE	ACILIUS	SPP.	1	1	5
8/17/2018	A2	DYTISCIDAE	NEOCLYPEODYTES	SPP.	6	3	5
8/17/2018	A2	HYDROPHILIDAE	TROPISTERNOS	SPP.	6	3	9.3
8/17/2018	A2	CHIRONOMIDAE			6	3	7

8/17/2018	A2	STRATIOMYIDAE	STRATIOMYS	SPP.	2	1	8.1
8/17/2018	A2	TIPULIDAE	TIPULA	SPP.	1	1	7.5
8/17/2018	A2	CORDULEGASTRIDAE	CORDULEGASTER	SPP.	7	3	5.7
8/17/2018	A2	PHYSIDAE	PHYSA	SPP.	146	10	8.7
8/17/2018	A3	BAETIDAE	BAETIS	SPP.	10	10	5
8/17/2018	A3	DYTISCIDAE	NEOCLYPEODYTES	SPP.	1	1	5
8/17/2018	A3	CHIRONOMIDAE			132	10	7
8/17/2018	A3	CORDULEGASTRIDAE	CORDULEGASTER	SPP.	10	10	5.7
8/17/2018	A3	PHYSIDAE	PHYSA	SPP.	13	10	8.7
8/17/2018	A4	BAETIDAE	BAETIS	SPP.	2	1	5
8/17/2018	A4	HYDROPHILIDAE	TROPISTERNOS	SPP.	16	10	9.3
8/17/2018	A4	CHIRONOMIDAE			18	10	7
8/17/2018	A4	PSYCHODIDAE	PSYCHODA	SPP.	1	1	9.6
8/17/2018	A4	STRATIOMYIDAE	STRATIOMYS	SPP.	1	1	8.1
8/17/2018	A4	TIPULIDAE	TIPULA	SPP.	1	1	7.5
8/17/2018	A4	AESHNIDAE	BOYERIA	GRAFIANA	1	1	3.8
8/17/2018	A4	CALOPTERYGIDAE	CALOPTERYX	SPP.	2	1	7.5
8/17/2018	A4	CORDULEGASTRIDAE	CORDULEGASTER	SPP.	5	3	5.7
8/17/2018	A4	PHYSIDAE	PHYSA	SPP.	1	1	8.7
8/16/2018	C1	BAETIDAE	BAETIS	SPP.	1	1	5
8/16/2018	C1	HYDROPSYCHIDAE	DIPLECTRONA	MODESTA	3	3	2.3
8/16/2018	C1	HYDROPHILIDAE	TROPISTERNOS	SPP.	1	1	9.3
8/16/2018	C1	CHIRONOMIDAE			2	1	7
8/16/2018	C1	EMPIDIDAE	HEMERODROMIA	SPP.	2	1	7.6
8/16/2018	C1	TIPULIDAE	PILARIA	SPP.	1	1	7
8/16/2018	C2	EPHEMERELLIDAE	DANNELLA	SIMPLEX	2	1	3.4
8/16/2018	C2	HEPTAGENIIDAE	MACCAFFERTIUM	MODESTUM	3	3	5.7
8/16/2018	C2	HYDROPSYCHIDAE	CHEUMATOPSYCHE	SPP.	1	1	6.6
8/16/2018	C2	LEPIDOSTOMATIDAE	LEPIDOSTOMA	SPP.	3	3	3
8/16/2018	C2	LIMNEPHILIDAE	PYCNOPSYCHE	SCABRIPENNIS	2	1	2.5
8/16/2018	C2	PHILOPOTAMIDAE	CHIMARRA	SPP.	1	1	3.3
8/16/2018	C2	UENOIDAE	NEOPHYLAX	OLIGIUS	13	10	2.4
8/16/2018	C2	ELMIDAE	DUBIRAPHIA	SPP.	1	1	5.5
8/16/2018	C2	PSEPHENIDAE	PSEPHENUS	HERRICKI	1	1	2.3
8/16/2018	C2	CHIRONOMIDAE			1	1	7
8/16/2018	C2	EPHYDRIDAE	EPHYDRA	SPP.	2	1	8
8/16/2018	C2	TABANIDAE	TABANUS	SPP.	4	3	8.5
8/16/2018	C2	TIPULIDAE	TIPULA	SPP.	1	1	7.5
8/16/2018	C2	TIPULIDAE	PILARIA	SPP.	8	3	7
8/16/2018	C2	CALOPTERYGIDAE	CALOPTERYX	SPP.	1	1	7.5
8/16/2018	C2	CORDULEGASTRIDAE	CORDULEGASTER	SPP.	2	1	5.7
8/16/2018	C2	SIALIDAE	SIALIS	SPP.	1	1	7
8/16/2018	D1	BAETIDAE	PLAUDITUS	CESTUS	8	3	4.6

8/16/2018	D1	PERLIDAE	PERLINELLA	DRYMO	1	1	1.3
8/16/2018	D1	HYDROPSYCHIDAE	CHEUMATOPSYCHE	SPP.	8	3	6.6
8/16/2018	D1	HYDROPHILIDAE	TROPISTERNOS	SPP.	8	3	9.3
8/16/2018	D1	CHIRONOMIDAE			47	10	7
8/16/2018	D1	CERATOPOGONIDAE	CULICOIDES	SPP.	1	1	6
8/16/2018	D1	TIPULIDAE	TIPULA	SPP.	2	1	7.5
8/16/2018	D1	CORDULEGASTRIDAE	CORDULEGASTER	SPP.	7	3	5.7
8/16/2018	D1	ERPOBDELLIDAE	ERPOBDELLA/MOOREOBDELLA		2	1	8.6
8/16/2018	D1	PHYSIDAE	PHYSA	SPP.	41	10	8.7
8/17/2018	R1	BAETIDAE	BAETIS	SPP.	2	1	5
8/17/2018	R1	HYDROPSYCHIDAE	CHEUMATOPSYCHE	SPP.	1	1	6.6
8/17/2018	R1	ELMIDAE	DUBIRAPHIA	SPP.	1	1	5.5
8/17/2018	R1	CHIRONOMIDAE			3	3	7
8/17/2018	R2	BAETIDAE	BAETIS	INTERCALARIS	2	1	5
8/17/2018	R2	HEPTAGENIIDAE	MACCAFFERTIUM	MODESTUM	1	1	5.7
8/17/2018	R2	HYDROPSYCHIDAE	CHEUMATOPSYCHE	SPP.	3	3	6.6
8/17/2018	R2	HYDROPHILIDAE	TROPISTERNOS	SPP.	1	1	9.3
8/17/2018	R2	CHIRONOMIDAE			5	3	7
8/17/2018	R2	AESHNIDAE	BOYERIA	GRAFIANA	1	1	3.8
8/17/2018	R2	CALOPTERYGIDAE	CALOPTERYX	SPP.	5	3	7.5
8/17/2018	R2	CORDULEGASTRIDAE	CORDULEGASTER	SPP.	1	1	5.7
8/17/2018	R2	GERRIDAE			1	1	5
11/8/2018	A1	BAETIDAE	BAETIS	INTERCALARIS	2	1	5
11/8/2018	A1	HYDROPSYCHIDAE	CHEUMATOPSYCHE	SPP.	20	10	6.6
11/8/2018	A1	HYDROPSYCHIDAE	DIPLECTRONA	MODESTA	2	1	2.3
11/8/2018	A1	PHILOPOTAMIDAE	CHIMARRA	SPP.	1	1	3.3
11/8/2018	A1	CHIRONOMIDAE			9	3	7
11/8/2018	A1	SIMULIIDAE	CNEPHIA	ORNITHOPHILA	4	3	4
11/8/2018	A1	PHYSIDAE	PHYSA	SPP.	6	3	8.7
11/8/2018	A2	BAETIDAE	BAETIS	SPP.	1	1	5
11/8/2018	A2	HYDROPSYCHIDAE	DIPLECTRONA	MODESTA	6	3	2.3
11/8/2018	A2	CHIRONOMIDAE			4	3	7
11/8/2018	A2	SIMULIIDAE	CNEPHIA	ORNITHOPHILA	1	1	4
11/8/2018	A2	CORDULEGASTRIDAE	CORDULEGASTER	SPP.	1	1	5.7
11/8/2018	A2	PHYSIDAE	PHYSA	SPP.	1	1	8.7
11/8/2018	A3	HYDROPSYCHIDAE	CHEUMATOPSYCHE	SPP.	1	1	6.6
11/8/2018	A3	HYDROPSYCHIDAE	HYDROPSYCHE	BETTENI	1	1	7.9
11/8/2018	A3	PHYSIDAE	PHYSA	SPP.	19	10	8.7
11/8/2018	A4	BAETIDAE	BAETIS	SPP.	6	3	5
11/8/2018	A4	HEPTAGENIIDAE	MACCAFFERTIUM	MODESTUM	1	1	5.7
11/8/2018	A4	HYDROPSYCHIDAE	CHEUMATOPSYCHE	SPP.	4	3	6.6
11/8/2018	A4	HYDROPSYCHIDAE	HYDROPSYCHE	BETTENI	2	1	7.9
11/8/2018	A4	CHIRONOMIDAE			2	1	7

11/8/2018	A4	SIMULIIDAE	CNEPHIA	ORNITHOPHILA	12	10	4
11/8/2018	A4	PHYSIDAE	PHYSA	SPP.	15	10	8.7
11/8/2018	C1	BAETIDAE	BAETIS	INTERCALARIS	18	10	5
11/8/2018	C1	EPHEMERELLIDAE	DANNELLA	SIMPLEX	1	1	3.4
11/8/2018	C1	HEPTAGENIIDAE	MACCAFFERTIUM	MODESTUM	25	10	5.7
11/8/2018	C1	HYDROPSYCHIDAE	CHEUMATOPSYCHE	SPP.	33	10	6.6
11/8/2018	C1	HYDROPSYCHIDAE	DIPLECTRONA	MODESTA	1	1	2.3
11/8/2018	C1	LIMNEPHILIDAE	PYCNOPSYCHE	SCABRIPENNIS	1	1	2.5
11/8/2018	C1	PHILOPOTAMIDAE	CHIMARRA	SPP.	1	1	3.3
11/8/2018	C1	ELMIDAE	DUBIRAPHIA	SPP.	7	3	5.5
11/8/2018	C1	CHIRONOMIDAE			7	3	7
11/8/2018	C1	SIMULIIDAE	CNEPHIA	ORNITHOPHILA	1	1	4
11/8/2018	C1	TABANIDAE	TABANUS	SPP.	1	1	8.5
11/8/2018	C1	TIPULIDAE	TIPULA	SPP.	1	1	7.5
11/8/2018	C1	GOMPHIDAE	PROGOMPHUS	OBSCURUS	3	3	8.2
11/8/2018	C2	BAETIDAE	BAETIS	INTERCALARIS	1	1	5
11/8/2018	C2	BAETIDAE	BAETIS	SPP.	1	1	5
11/8/2018	C2	EPHEMERELLIDAE	DANNELLA	SIMPLEX	1	1	3.4
11/8/2018	C2	HEPTAGENIIDAE	MACCAFFERTIUM	MODESTUM	7	3	5.7
11/8/2018	C2	CHLOROPERLIDAE	ALLOPERLA	SPP.	10	10	1
11/8/2018	C2	PERLIDAE	PERLINELLA	DRYMO	4	3	1.3
11/8/2018	C2	HYDROPSYCHIDAE	DIPLECTRONA	MODESTA	12	10	2.3
11/8/2018	C2	RHYACOPHILIDAE	RHYACOPHILA	TORVA	2	1	1.5
11/8/2018	C2	ELMIDAE	DUBIRAPHIA	SPP.	6	3	5.5
11/8/2018	C2	CHIRONOMIDAE			4	3	7
11/8/2018	C2	SIMULIIDAE	CNEPHIA	ORNITHOPHILA	3	3	4
11/8/2018	C2	TABANIDAE	TABANUS	SPP.	2	1	8.5
11/8/2018	C2	TIPULIDAE	HEXATOMA	SPP.	1	1	3.5
11/8/2018	C2	TIPULIDAE	PILARIA	SPP.	1	1	7
11/8/2018	C2	TIPULIDAE	TIPULA	SPP.	1	1	7.5
11/8/2018	C2	GOMPHIDAE	PROGOMPHUS	OBSCURUS	1	1	8.2
11/8/2018	C2	CORBICULIDAE	CORBICULA	FLUMINEA	1	1	6.6
11/8/2018	D1	HEPTAGENIIDAE	MACCAFFERTIUM	MODESTUM	2	1	5.7
11/8/2018	D1	HYDROPSYCHIDAE	CHEUMATOPSYCHE	SPP.	162	10	6.6
11/8/2018	D1	CHIRONOMIDAE			5	3	7
11/8/2018	D1	TABANIDAE	TABANUS	SPP.	2	1	8.5
11/8/2018	D1	CORDULEGASTRIDAE	CORDULEGASTER	SPP.	1	1	5.7
11/8/2018	D1	GOMPHIDAE	PROGOMPHUS	OBSCURUS	1	1	8.2
11/8/2018	D1	ERPOBDELLIDAE	ERPOBDELLA/MOOREOBDELLA		1	1	8.6
11/8/2018	D1	PHYSIDAE	PHYSA	SPP.	14	10	8.7
11/8/2018	D2	HEPTAGENIIDAE	MACCAFFERTIUM	MODESTUM	2	1	5.7
11/8/2018	D2	HYDROPSYCHIDAE	CHEUMATOPSYCHE	SPP.	162	10	6.6
11/8/2018	D2	CHIRONOMIDAE			5	3	7

11/8/2018	D2	TABANIDAE	TABANUS	SPP.	2	1	8.5
11/8/2018	D2	CORDULEGASTRIDAE	CORDULEGASTER	SPP.	1	1	5.7
11/8/2018	D2	GOMPHIDAE	PROGOMPHUS	OBSCURUS	1	1	8.2
11/8/2018	D2	ERPOBDELLIDAE	ERPOBDELLA/MOOREOBDELLA		1	1	8.6
11/8/2018	D2	PHYSIDAE	PHYSA	SPP.	14	10	8.7
11/8/2018	P1	HYDROPSYCHIDAE	CHEUMATOPSYCHE	SPP.	6	3	6.6
11/8/2018	P1	CHIRONOMIDAE			26	10	7
11/8/2018	P1	CALOPTERYGIDAE	CALOPTERYX	SPP.	1	1	7.5
2/26/2019	A1	HYDROPSYCHIDAE	CHEUMATOPSYCHE	SPP.	2	1	6.6
2/26/2019	A1	HYDROPSYCHIDAE	HYDROPSYCHE	BETTENI	2	1	7.9
2/26/2019	A1	UENOIDAE	NEOPHYLAX	OLIGIUS	3	3	2.4
2/26/2019	A1	CHIRONOMIDAE			48	10	7
2/26/2019	A1	ERPOBDELLIDAE	ERPOBDELLA/MOOREOBDELLA		1	1	8.6
2/26/2019	A1	PHYSIDAE	PHYSA	SPP.	10	10	8.7
2/26/2019	A2	BAETIDAE	BAETIS	INTERCALARIS	4	3	5
2/26/2019	A2	HYDROPSYCHIDAE	CHEUMATOPSYCHE	SPP.	10	10	6.6
2/26/2019	A2	CHIRONOMIDAE			115	10	7
2/26/2019	A2	SIMULIIDAE	CNEPHIA	ORNITHOPHILA	2	1	4
2/26/2019	A2	COENAGRIONIDAE	ARGIA	SPP.	1	1	8.3
2/26/2019	A2	ERPOBDELLIDAE	ERPOBDELLA/MOOREOBDELLA		1	1	8.6
2/26/2019	A2	PHYSIDAE	PHYSA	SPP.	11	10	8.7
2/26/2019	A3	BAETIDAE	PLAUDITUS	CESTUS	1	1	4.6
2/26/2019	A3	HEPTAGENIIDAE	MACCAFFERTIUM	MODESTUM	1	1	5.7
2/26/2019	A3	HYDROPSYCHIDAE	CHEUMATOPSYCHE	SPP.	4	3	6.6
2/26/2019	A3	CHIRONOMIDAE			27	10	7
2/26/2019	A3	SIMULIIDAE			3	3	6
2/26/2019	A3	PHYSIDAE	PHYSA	SPP.	12	10	8.7
2/26/2019	A4	BAETIDAE	BAETIS	INTERCALARIS	11	10	5
2/26/2019	A4	HEPTAGENIIDAE	MACCAFFERTIUM	MODESTUM	1	1	5.7
2/26/2019	A4	HYDROPSYCHIDAE	CHEUMATOPSYCHE	SPP.	5	3	6.6
2/26/2019	A4	CHIRONOMIDAE			66	10	7
2/26/2019	A4	COENAGRIONIDAE	ARGIA	SPP.	1	1	8.3
2/26/2019	A4	CORDULEGASTRIDAE	CORDULEGASTER	SPP.	3	3	5.7
2/26/2019	A4	PHYSIDAE	PHYSA	SPP.	2	1	8.7
2/25/2019	C1	BAETIDAE	BAETIS	SPP.	4	3	5
2/25/2019	C1	EPHEMERELLIDAE	EPHEMERELLA	DOROTHEA	23	10	3.3
2/25/2019	C1	HEPTAGENIIDAE	MACCAFFERTIUM	MODESTUM	7	3	5.7
2/25/2019	C1	CHLOROPERLIDAE	ALLOPERLA	SPP.	1	1	1
2/25/2019	C1	PERLIDAE	PERLINELLA	DRYMO	1	1	1.3
2/25/2019	C1	NEMOURIDAE	APHINEMURA	SPP.	1	1	3.8
2/25/2019	C1	HYDROPSYCHIDAE	HYDROPSYCHE	BETTENI	9	3	7.9
2/25/2019	C1	CHIRONOMIDAE			9	3	7
2/25/2019	C1	SIMULIIDAE	CNEPHIA	ORNITHOPHILA	3	3	4

2/25/2019	C1	TABANIDAE	TABANUS	SPP.	1	1	8.5
2/25/2019	C1	GOMPHIDAE	PROGOMPHUS	OBSCURUS	1	1	8.2
2/25/2019	C2	EPHEMERELLIDAE	EPHEMERELLA	DOROTHEA	19	10	3.3
2/25/2019	C2	HEPTAGENIIDAE	MACCAFFERTIUM	MODESTUM	6	3	5.7
2/25/2019	C2	CHLOROPERLIDAE	ALLOPERLA	SPP.	10	10	1
2/25/2019	C2	HYDROPSYCHIDAE	DIPLECTRONA	MODESTA	1	1	2.3
2/25/2019	C2	HYDROPSYCHIDAE	HYDROPSYCHE	BETTENI	7	3	7.9
2/25/2019	C2	LIMNEPHILIDAE	PYCNOPSYCHE	SCABRIPENNIS	1	1	2.5
2/25/2019	C2	UENOIDAE	NEOPHYLAX	OLIGIUS	10	10	2.4
2/25/2019	C2	PSEPHENIDAE	PSEPHENUS	HERRICKI	3	3	2.3
2/25/2019	C2	CHIRONOMIDAE			8	3	7
2/25/2019	C2	TIPULIDAE	TIPULA	SPP.	1	1	7.5
2/25/2019	C2	GOMPHIDAE	PROGOMPHUS	OBSCURUS	2	1	8.2
2/25/2019	D1	HEPTAGENIIDAE	MACCAFFERTIUM	MODESTUM	1	1	5.7
2/25/2019	D1	HYDROPSYCHIDAE	CHEUMATOPSYCHE	SPP.	42	10	6.6
2/25/2019	D1	CHIRONOMIDAE			29	10	7
2/25/2019	D1	TABANIDAE	TABANUS	SPP.	1	1	8.5
2/25/2019	D1	TIPULIDAE	TIPULA	SPP.	1	1	7.5
2/25/2019	D1	CORDULEGASTRIDAE	CORDULEGASTER	SPP.	1	1	5.7
2/25/2019	D1	GOMPHIDAE	PROGOMPHUS	OBSCURUS	1	1	8.2
2/25/2019	D2	HYDROPSYCHIDAE			46	10	4
2/25/2019	D2	CHIRONOMIDAE			35	10	7
2/25/2019	D2	TIPULIDAE	TIPULA	SPP.	1	1	7.5
2/25/2019	D2	COENAGRIONIDAE	ARGIA	SPP.	1	1	8.3
2/25/2019	D2	ERPOBDELLIDAE	ERPOBDELLA/MOOREOBDELLA		1	1	8.6
2/26/2019	R1	BAETIDAE	BAETIS	INTERCALARIS	2	1	5
2/26/2019	R1	EPHEMERELLIDAE	EPHEMERELLA	DOROTHEA	1	1	3.3
2/26/2019	R1	CHIRONOMIDAE			12	10	7
2/26/2019	R1	CORDULEGASTRIDAE	CORDULEGASTER	SPP.	1	1	5.7
2/26/2019	R2	CHIRONOMIDAE			39	10	7
2/26/2019	R2	SIMULIIDAE	CNEPHIA	ORNITHOPHILA	1	1	4
2/26/2019	R2	PHYSIDAE	PHYSA	SPP.	1	1	8.7
2/25/2019	P1	HYDROPSYCHIDAE	CHEUMATOPSYCHE	SPP.	3	3	6.6
2/25/2019	P1	CHIRONOMIDAE			11	10	7
2/25/2019	P1	SIMULIIDAE	CNEPHIA	ORNITHOPHILA	1	1	4
2/25/2019	P1	ERPOBDELLIDAE	ERPOBDELLA/MOOREOBDELLA		1	1	8.6
2/25/2019	P1	PHYSIDAE	PHYSA	SPP.	11	10	8.7
7/17/2019	A1	BAETIDAE			1	1	5
7/17/2019	A1	BAETIDAE	BAETIS	INTERCALARIS	5	3	5
7/17/2019	A1	EPHEMERELLIDAE	EPHEMERELLA	DOROTHEA	1	1	3.3
7/17/2019	A1	HEPTAGENIIDAE	MACCAFFERTIUM	MODESTUM	2	1	5.7
7/17/2019	A1	HYDROPSYCHIDAE	CHEUMATOPSYCHE	SPP.	86	10	6.6
7/17/2019	A1	HYDROPSYCHIDAE	HYDROPSYCHE	BETTENI	30	10	7.9

7/17/2019	A1	DYTISCIDAE	NEOCLYPEODYTES	SPP.	1	1	5
7/17/2019	A1	HYDROPHILIDAE	TROPISTERNOS	SPP.	4	3	9.3
7/17/2019	A1	CHIRONOMIDAE			39	10	7
7/17/2019	A1	COENAGRIONIDAE	ARGIA	SPP.	2	1	8.3
7/17/2019	A1	GOMPHIDAE	OPHIOGOMPHUS	SPP.	1	1	5.9
7/17/2019	A1	PHYSIDAE	PHYSA	SPP.	2	1	8.7
7/17/2019	A2	HEPTAGENIIDAE	MACCAFFERTIUM	MODESTUM	1	1	5.7
7/17/2019	A2	HYDROPSYCHIDAE	CHEUMATOPSYCHE	SPP.	36	10	6.6
7/17/2019	A2	HYDROPSYCHIDAE	HYDROPSYCHE	BETTENI	11	10	7.9
7/17/2019	A2	DYTISCIDAE	NEOCLYPEODYTES	SPP.	2	1	5
7/17/2019	A2	HYDROPHILIDAE	TROPISTERNOS	SPP.	4	3	9.3
7/17/2019	A2	CHIRONOMIDAE			20	10	7
7/17/2019	A2	TIPULIDAE	TIPULA	SPP.	2	1	7.5
7/17/2019	A2	COENAGRIONIDAE	ARGIA	SPP.	11	10	8.3
7/17/2019	A3	BAETIDAE	BAETIS	INTERCALARIS	22	10	5
7/17/2019	A3	HYDROPSYCHIDAE	CHEUMATOPSYCHE	SPP.	63	10	6.6
7/17/2019	A3	HYDROPSYCHIDAE	HYDROPSYCHE	BETTENI	106	10	7.9
7/17/2019	A3	CHIRONOMIDAE			112	10	7
7/17/2019	A3	TABANIDAE	TABANUS	SPP.	1	1	8.5
7/17/2019	A3	COENAGRIONIDAE	ARGIA	SPP.	3	3	8.3
7/17/2019	A3	CORDULEGASTRIDAE	CORDULEGASTER	SPP.	2	1	5.7
7/17/2019	A3	GOMPHIDAE	PROGOMPHUS	OBSCURUS	1	1	8.2
7/17/2019	A3	ERPOBDELLIDAE	ERPOBDELLA/MOOREOBDELLA		1	1	8.6
7/17/2019	A4	BAETIDAE	BAETIS	INTERCALARIS	1	1	5
7/17/2019	A4	HEPTAGENIIDAE	MACCAFFERTIUM	MODESTUM	7	3	5.7
7/17/2019	A4	HYDROPSYCHIDAE	CHEUMATOPSYCHE	SPP.	23	10	6.6
7/17/2019	A4	HYDROPSYCHIDAE	HYDROPSYCHE	BETTENI	7	3	7.9
7/17/2019	A4	HALIPIDAE	PELTODYTES	SPP.	1	1	8.4
7/17/2019	A4	CHIRONOMIDAE			1	1	7
7/17/2019	A4	TABANIDAE	TABANUS	SPP.	1	1	8.5
7/17/2019	A4	TIPULIDAE	TIPULA	SPP.	1	1	7.5
7/17/2019	A4	COENAGRIONIDAE	ARGIA	SPP.	23	10	8.3
7/17/2019	A4	PHYSIDAE	PHYSA	SPP.	2	1	8.7
7/15/2019	C1	BAETIDAE	BAETIS	INTERCALARIS	2	1	5
7/15/2019	C1	BAETIDAE	PLAUDITUS	CESTUS	3	3	4.6
7/15/2019	C1	EPHEMERELLIDAE	EPHEMERELLA	DOROTHEA	2	1	3.3
7/15/2019	C1	HEPTAGENIIDAE	MACCAFFERTIUM	MODESTUM	6	3	5.7
7/15/2019	C1	PERLIDAE	ECCOPTURA	XANTHENES	9	3	4.7
7/15/2019	C1	HYDROPSYCHIDAE	CHEUMATOPSYCHE	SPP.	18	10	6.6
7/15/2019	C1	HYDROPSYCHIDAE	HYDROPSYCHE	BETTENI	68	10	7.9
7/15/2019	C1	ELMIDAE	DUBIRAPHIA	SPP.	2	1	5.5
7/15/2019	C1	CHIRONOMIDAE			14	10	7
7/15/2019	C1	AESHNIDAE	BOYERIA	GRAFIANA	1	1	3.8

7/15/2019	C1	GOMPHIDAE	PROGOMPHUS	OBSCURUS	1	1	8.2
7/15/2019	C2	HEPTAGENIIDAE	MACCAFFERTIUM	MODESTUM	7	3	5.7
7/15/2019	C2	PERLIDAE	PERLINELLA	DRYMO	7	3	1.3
7/15/2019	C2	HYDROPSYCHIDAE	CHEUMATOPSYCHE	SPP.	4	3	6.6
7/15/2019	C2	HYDROPSYCHIDAE	DIPLECTRONA	MODESTA	1	1	2.3
7/15/2019	C2	HYDROPSYCHIDAE	HYDROPSYCHE	BETTENI	2	1	7.9
7/15/2019	C2	LEPIDOSTOMATIDAE	LEPIDOSTOMA	SPP.	1	1	1
7/15/2019	C2	PSEPHENIDAE	ECTOPRIA	NERVOSA	2	1	4.3
7/15/2019	C2	CHIRONOMIDAE			3	3	7
7/15/2019	D1	HYDROPSYCHIDAE	CHEUMATOPSYCHE	SPP.	29	10	6.6
7/15/2019	D1	HYDROPSYCHIDAE	HYDROPSYCHE	BETTENI	10	10	7.9
7/15/2019	D1	CHIRONOMIDAE			9	3	7
7/15/2019	D1	COENAGRIONIDAE	ARGIA	SPP.	1	1	8.3
7/15/2019	D1	LIBELLULIDAE	ERYTHEMIS	SIMPLICICOLLIS	1	1	9.7
7/15/2019	D1	ERPOBDELLIDAE	ERPOBDELLA/MOOREOBDELLA		3	3	8.6
7/15/2019	D1	PHYSIDAE	PHYSA	SPP.	1	1	8.7
7/15/2019	D2	HYDROPSYCHIDAE	CHEUMATOPSYCHE	SPP.	25	10	6.6
7/15/2019	D2	HYDROPSYCHIDAE	HYDROPSYCHE	BETTENI	5	3	7.9
7/15/2019	D2	HYDROPHILIDAE	TROPISTERNOS	SPP.	1	1	9.3
7/15/2019	D2	CHIRONOMIDAE			7	3	7
7/15/2019	D2	TIPULIDAE	DICRANOTA	SPP.	1	1	0
7/15/2019	D2	CALOPTERYGIDAE	CALOPTERYX	SPP.	1	1	7.5
7/15/2019	D2	COENAGRIONIDAE	ARGIA	SPP.	6	3	8.3
7/15/2019	D2	ERPOBDELLIDAE	ERPOBDELLA/MOOREOBDELLA		1	1	8.6
7/15/2019	D2	PHYSIDAE	PHYSA	SPP.	2	1	8.7
7/17/2019	R1	BAETIDAE	BAETIS	INTERCALARIS	4	3	5
7/17/2019	R1	EPHEMERELLIDAE	DANNELLA	SIMPLEX	3	3	3.4
7/17/2019	R1	HEPTAGENIIDAE	MACCAFFERTIUM	MODESTUM	19	10	5.7
7/17/2019	R1	HYDROPSYCHIDAE	CHEUMATOPSYCHE	SPP.	19	10	6.6
7/17/2019	R1	HYDROPHILIDAE	TROPISTERNOS	SPP.	1	1	9.3
7/17/2019	R1	CHIRONOMIDAE			28	10	7
7/17/2019	R1	GOMPHIDAE	OPHIOGOMPHUS	SPP.	1	1	5.9
7/17/2019	R1	GOMPHIDAE	PROGOMPHUS	OBSCURUS	1	1	8.2
7/17/2019	R1	ERPOBDELLIDAE	ERPOBDELLA/MOOREOBDELLA		3	3	8.6
7/17/2019	R1	PHYSIDAE	PHYSA	SPP.	2	1	8.7
7/17/2019	R2	HEPTAGENIIDAE	MACCAFFERTIUM	MODESTUM	14	10	5.7
7/17/2019	R2	HYDROPSYCHIDAE	CHEUMATOPSYCHE	SPP.	48	10	6.6
7/17/2019	R2	HYDROPSYCHIDAE	HYDROPSYCHE	BETTENI	48	10	7.9
7/17/2019	R2	PHILOPOTAMIDAE	CHIMARRA	SPP.	1	1	3.3
7/17/2019	R2	CHIRONOMIDAE			33	10	7
7/17/2019	R2	PHYSIDAE	PHYSA	SPP.	2	1	8.7
7/15/2019	P1	AMELETIDAE	AMELETUS	LINEATUS	1	1	2.4
7/15/2019	P1	HYDROPSYCHIDAE	CHEUMATOPSYCHE	SPP.	151	10	6.6

7/15/2019	P1	HYDROPSYCHIDAE	HYDROPSYCHE	BETTENI	67	10	7.9
7/15/2019	P1	CHIRONOMIDAE			47	10	7
7/15/2019	P1	TIPULIDAE	TIPULA	SPP.	1	1	7.5
7/15/2019	P1	CALOPTERYGIDAE	CALOPTERYX	SPP.	1	1	7.5
7/15/2019	P1	COENAGRIONIDAE	ARGIA	SPP.	1	1	8.3
7/15/2019	P1	LIBELLULIDAE	PLATHEMIS	SPP.	1	1	9.4
7/15/2019	P1	PHYSIDAE	PHYSA	SPP.	1	1	8.7
11/22/2019	A1	BAETIDAE	BAETIS	SPP.	1	1	5
11/22/2019	A1	EPHEMERELLIDAE	DANNELLA	SIMPLEX	9	3	3.4
11/22/2019	A1	HEPTAGENIIDAE	MACCAFFERTIUM	MODESTUM	1	1	5.7
11/22/2019	A1	PERLIDAE	PERLINELLA	DRYMO	1	1	1.3
11/22/2019	A1	CHIRONOMIDAE			53	10	7
11/22/2019	A1	SIMULIIDAE	CNEPHIA	ORNITHOPHILA	2	1	4
11/22/2019	A1	LIBELLULIDAE	PLATHEMIS	SPP.	1	1	9.4
11/22/2019	A1	LIBELLULIDAE	LIBELLULA	SPP.	1	1	9.4
11/22/2019	A1	PHYSIDAE	PHYSA	SPP.	1	1	8.7
11/22/2019	A2	BAETIDAE	BAETIS	INTERCALARIS	6	3	5
11/22/2019	A2	EPHEMERELLIDAE	EPHEMERELLA	DOROTHEA	2	1	3.3
11/22/2019	A2	HEPTAGENIIDAE	MACCAFFERTIUM	MODESTUM	2	1	5.7
11/22/2019	A2	HYDROPSYCHIDAE	CHEUMATOPSYCHE	SPP.	3	3	6.6
11/22/2019	A2	UENOIDAE	NEOPHYLAX	OLIGIUS	2	1	2.4
11/22/2019	A2	CHIRONOMIDAE			36	10	7
11/22/2019	A2	SIMULIIDAE	CNEPHIA	ORNITHOPHILA	1	1	4
11/22/2019	A2	COENAGRIONIDAE	ARGIA	SPP.	18	10	8.3
11/22/2019	A2	LIBELLULIDAE	LIBELLULA	SPP.	1	1	9.4
11/22/2019	A2	HAPLOTAXIDAE	HAPLOTAXIS	GORDIOIDES	1	1	3.6
11/22/2019	A2	PHYSIDAE	PHYSA	SPP.	6	3	8.7
11/22/2019	A3	CHIRONOMIDAE			1	1	7
11/22/2019	A3	EPHYDRIDAE	EPHYDRA	SPP.	2	1	8
11/22/2019	A3	AESHNIDAE	BOYERIA	GRAFIANA	1	1	3.8
11/22/2019	A3	COENAGRIONIDAE	ARGIA	SPP.	4	3	8.3
11/22/2019	A3	LIBELLULIDAE	ERYTHEMIS	SIMPLICICOLLIS	1	1	9.7
11/22/2019	A3	PHYSIDAE	PHYSA	SPP.	11	10	8.7
11/22/2019	A4	CHIRONOMIDAE			28	10	7
11/22/2019	A4	COENAGRIONIDAE	ARGIA	SPP.	3	3	8.3
11/20/2019	C1	HEPTAGENIIDAE	MACCAFFERTIUM	MODESTUM	2	1	5.7
11/20/2019	C1	HYDROPSYCHIDAE	CHEUMATOPSYCHE	SPP.	7	3	6.6
11/20/2019	C1	HYDROPSYCHIDAE	HYDROPSYCHE	BETTENI	7	3	7.9
11/20/2019	C1	PTILODACTYLIDAE	ANCHYTARUS	BICOLOR	2	1	2.4
11/20/2019	C1	CHIRONOMIDAE			39	10	7
11/20/2019	C1	EPHYDRIDAE	EPHYDRA	SPP.	1	1	8
11/20/2019	C1	TABANIDAE	TABANUS	SPP.	1	1	8.5
11/20/2019	C1	TIPULIDAE	TIPULA	SPP.	1	1	7.5

11/20/2019	C1	CALOPTERYGIDAE	CALOPTERYX	SPP.	1	1	7.5
11/20/2019	C1	GOMPHIDAE	PROGOMPHUS	OBSCURUS	5	3	8.2
11/20/2019	C2	CHLOROPERLIDAE	ALLOPERLA	SPP.	3	3	1
11/20/2019	C2	HYDROPSYCHIDAE	CHEUMATOPSYCHE	SPP.	1	1	6.6
11/20/2019	C2	CHIRONOMIDAE			10	10	7
11/20/2019	C2	SIMULIIDAE	PROSIMULIUM	SPP.	1	1	4.5
11/20/2019	C2	TIPULIDAE	TIPULA	SPP.	1	1	7.5
11/20/2019	C2	GOMPHIDAE	HAGENIUS	BREVISTYLUS	1	1	4.4
11/20/2019	D1	BAETIDAE	BAETIS	SPP.	1	1	5
11/20/2019	D1	HEPTAGENIIDAE	MACCAFFERTIUM	MODESTUM	3	3	5.7
11/20/2019	D1	CHLOROPERLIDAE	ALLOPERLA	SPP.	3	3	1
11/20/2019	D1	HYDROPSYCHIDAE	CHEUMATOPSYCHE	SPP.	1	1	6.6
11/20/2019	D1	DYTISCIDAE	NEOCLYPEODYTES	SPP.	2	1	5
11/20/2019	D1	CHIRONOMIDAE			8	3	7
11/20/2019	D1	COENAGRIONIDAE	ARGIA	SPP.	2	1	8.3
11/20/2019	D1	LIBELLULIDAE	LIBELLULA	SPP.	1	1	9.4
11/20/2019	D1	PHYSIDAE	PHYSA	SPP.	1	1	8.7
11/20/2019	D2	BAETIDAE	BAETIS	SPP.	5	3	5
11/20/2019	D2	HYDROPSYCHIDAE	CHEUMATOPSYCHE	SPP.	5	3	6.6
11/20/2019	D2	HYDROPSYCHIDAE	HYDROPSYCHE	BETTENI	1	1	7.9
11/20/2019	D2	PHILOPOTAMIDAE	CHIMARRA	SPP.	1	1	3.3
11/20/2019	D2	CHIRONOMIDAE			3	3	7
11/20/2019	D2	CALOPTERYGIDAE	CALOPTERYX	SPP.	1	1	7.5
11/20/2019	D2	COENAGRIONIDAE	ARGIA	SPP.	17	10	8.3
11/20/2019	D2	LIBELLULIDAE	ERYTHEMIS	SIMPLICICOLLIS	3	3	9.7
11/22/2019	R1	EPHEMERELLIDAE	EPHEMERELLA	DOROTHEA	5	3	3.3
11/22/2019	R1	HEPTAGENIIDAE	MACCAFFERTIUM	MODESTUM	101	10	5.7
11/22/2019	R1	HYDROPSYCHIDAE	HYDROPSYCHE	BETTENI	2	1	7.9
11/22/2019	R1	PHILOPOTAMIDAE	CHIMARRA	SPP.	11	10	3.3
11/22/2019	R1	CHIRONOMIDAE			46	10	7
11/22/2019	R1	PTILODACTYLIDAE	ANCHYTARUS	BICOLOR	1	1	2.4
11/22/2019	R2	BAETIDAE	BAETIS	INTERCALARIS	3	3	5
11/22/2019	R2	EPHEMERELLIDAE	EPHEMERELLA	DOROTHEA	1	1	3.3
11/22/2019	R2	HEPTAGENIIDAE	MACCAFFERTIUM	MODESTUM	17	10	5.7
11/22/2019	R2	HYDROPSYCHIDAE	CHEUMATOPSYCHE	SPP.	5	3	6.6
11/22/2019	R2	HYDROPSYCHIDAE	HYDROPSYCHE	BETTENI	3	3	7.9
11/22/2019	R2	PHILOPOTAMIDAE	CHIMARRA	SPP.	1	1	3.3
11/22/2019	R2	CHIRONOMIDAE			32	10	7
11/22/2019	R2	SIMULIIDAE	CNEPHIA	ORNITHOPHILA	13	10	4
11/22/2019	R2	COENAGRIONIDAE	ARGIA	SPP.	1	1	8.3
11/22/2019	R2	GOMPHIDAE	PROGOMPHUS	OBSCURUS	1	1	8.2
11/22/2019	R2	PHYSIDAE	PHYSA	SPP.	10	10	8.7
11/20/2019	P1	CHIRONOMIDAE			4	3	7

11/20/2019	P1	COENAGRIONIDAE	ARGIA	SPP.	2	1	8.3
11/20/2019	P1	HAPLOTAXIDAE	HAPLOTAXIS	GORDIOIDES	1	1	3.6
2/14/2020	A1	HEPTAGENIIDAE	MACCAFFERTIUM	MODESTUM	32	10	5.7
2/14/2020	A1	HYDROPSYCHIDAE	CHEUMATOPSYCHE	SPP.	5	3	6.6
2/14/2020	A1	HYDROPSYCHIDAE	HYDROPSYCHE	BETTENI	1	1	7.9
2/14/2020	A1	PHILOPOTAMIDAE	CHIMARRA	SPP.	2	1	3.3
2/14/2020	A1	PTILODACTYLIDAE	ANCHYTARUS	BICOLOR	1	1	2.4
2/14/2020	A1	CHIRONOMIDAE			40	10	7
2/14/2020	A1	CORYDALIDAE	NIGRONIA	FASCIATUS	1	1	6.1
2/14/2020	A1	ERPOBDELLIDAE	ERPOBDELLA/MOOREOBDELLA		1	1	8.6
2/14/2020	A1	CORBICULIDAE	CORBICULA	FLUMINEA	1	1	6.6
2/14/2020	A2	BAETIDAE	BAETIS	SPP.	5	3	5
2/14/2020	A2	HEPTAGENIIDAE	MACCAFFERTIUM	MODESTUM	10	10	5.7
2/14/2020	A2	HYDROPSYCHIDAE	CHEUMATOPSYCHE	SPP.	3	3	6.6
2/14/2020	A2	HYDROPSYCHIDAE	HYDROPSYCHE	BETTENI	4	3	7.9
2/14/2020	A2	CHIRONOMIDAE			68	10	7
2/14/2020	A2	TIPULIDAE	PILARIA	SPP.	1	1	8.2
2/14/2020	A2	CALOPTERYGIDAE	CALOPTERYX	SPP.	4	3	7.5
2/14/2020	A2	COENAGRIONIDAE	ARGIA	SPP.	11	10	8.3
2/14/2020	A2	LIBELLULIDAE	PLATHEMIS	SPP.	1	1	9.4
2/14/2020	A2	ERPOBDELLIDAE	ERPOBDELLA/MOOREOBDELLA		1	1	8.6
2/14/2020	A3	EPHEMERELLIDAE	DANNELLA	SIMPLEX	1	1	3.4
2/14/2020	A3	CHIRONOMIDAE			62	10	7
2/14/2020	A3	SIMULIDAE	SIMULIUM	SPP.	2	1	9.5
2/14/2020	A3	COENAGRIONIDAE	ARGIA	SPP.	1	1	8.3
2/14/2020	A3	HAPLOTAXIDAE	HAPLOTAXIS	GORDIOIDES	7	3	3.6
2/14/2020	A3	PHYSIDAE	PHYSA	SPP.	4	3	8.7
2/14/2020	A4	HEPTAGENIIDAE	MACCAFFERTIUM	MODESTUM	1	1	5.7
2/14/2020	A4	CHIRONOMIDAE			49	10	7
2/14/2020	A4	SIMULIDAE	SIMULIUM	SPP.	1	1	9.5
2/14/2020	A4	TABANIDAE	TABANUS	SPP.	1	1	8.5
2/14/2020	A4	TIPULIDAE	TIPULA	SPP.	1	1	9.5
2/14/2020	A4	COENAGRIONIDAE	ARGIA	SPP.	14	10	8.3
2/14/2020	A4	LIBELLULIDAE	PLATHEMIS	SPP.	2	1	9.4
2/14/2020	A4	CORYDALIDAE	NIGRONIA	FASCIATUS	1	1	6.1
2/14/2020	C1	BAETIDAE	BAETIS	SPP.	1	1	5
2/14/2020	C1	EPHEMERELLIDAE	DANNELLA	SIMPLEX	3	3	3.4
2/14/2020	C1	HEPTAGENIIDAE	MACCAFFERTIUM	MODESTUM	4	3	5.7
2/14/2020	C1	PERLIDAE	ECCOPTURA	XANTHENES	3	3	4.7
2/14/2020	C1	HYDROPSYCHIDAE	CHEUMATOPSYCHE	SPP.	2	1	6.6
2/14/2020	C1	HYDROPSYCHIDAE	DIPLECTRONA	MODESTA	1	1	2.3
2/14/2020	C1	HYDROPSYCHIDAE	HYDROPSYCHE	BETTENI	3	3	7.9
2/14/2020	C1	LEPIDOSTOMATIDAE	LEPIDOSTOMA	SPP.	14	10	1

2/14/2020	C1	CHRYSOMELIDAE	DONACIA	SPP.	1	1	5
2/14/2020	C1	PHILODACTYLIDAE	ANCHYTARUS	BICOLOR	1	1	2.4
2/14/2020	C1	PSEPHENIDAE	ECTOPRIA	BICOLOR	1	1	4.3
2/14/2020	C1	CHIRONOMIDAE			18	10	7
2/14/2020	C1	TIPULIDAE	DICRANOTA	SPP.	1	1	5.9
2/14/2020	C1	GOMPHIDAE	PROGOMPHUS	OBSCURUS	12	10	8.2
2/14/2020	C1	HAPLOTAXIDAE	HAPLOTAXIS	GORDIOIDES	2	1	3.6
2/14/2020	C2	EPHEMERELLIDAE	EPHEMERELLA	DOROTHEA	16	10	3.3
2/14/2020	C2	HEPTAGENIIDAE	MACCAFFERTIUM	MODESTUM	23	10	5.7
2/14/2020	C2	HYDROPSYCHIDAE	CHEUMATOPSYCHE	SPP.	8	3	6.6
2/14/2020	C2	HYDROPSYCHIDAE	HYDROPSYCHE	BETTENI	1	1	7.9
2/14/2020	C2	LEPIDOSTOMATIDAE	LEPIDOSTOMA	SPP.	4	3	1
2/14/2020	C2	CHIRONOMIDAE			19	10	7
2/14/2020	C2	TIPULIDAE	PILARIA	SPP.	4	3	8.2
2/14/2020	C2	TIPULIDAE	TIPULA	SPP.	3	3	9.5
2/14/2020	C2	CALOPTERYGIDAE	CALOPTERYX	SPP.	2	1	7.5
2/14/2020	C2	CORDULEGASTRIDAE	CORDULEGASTER	SPP.	1	1	5.7
2/14/2020	C2	HAPLOTAXIDAE	HAPLOTAXIS	GORDIOIDES	2	1	3.6
2/14/2020	C2	CORYDALIDAE	NIRGONIA	FASCIATUS	1	1	6.1
2/14/2020	C2	GOMPHIDAE	PROGOMPHUS	OBSCURUS	1	1	8.2
2/14/2020	D1	EPHEMERELLIDAE	DANNELLA	SIMPLEX	1	1	3.4
2/14/2020	D1	HEPTAGENIIDAE	MACCAFFERTIUM	MODESTUM	1	1	5.7
2/14/2020	D1	HYDROPSYCHIDAE	CHEUMATOPSYCHE	SPP.	1	1	6.6
2/14/2020	D1	CHIRONOMIDAE			44	10	7
2/14/2020	D1	TIPULIDAE	TIPULA	SPP.	1	1	9.5
2/14/2020	D1	COENAGRIONIDAE	ARGIA	SPP.	9	3	8.3
2/14/2020	D1	GOMPHIDAE	PROGOMPHUS	OBSCURUS	3	3	8.2
2/14/2020	D1	ERPOBDELLIDAE	ERPOBDELLA/MOOREOBDELLA		2	1	8.6
2/14/2020	D2	HYDROPSYCHIDAE	CHEUMATOPSYCHE	SPP.	6	3	6.6
2/14/2020	D2	PHILODACTYLIDAE	ANCHYTARUS	BICOLOR	1	1	2.4
2/14/2020	D2	CHIRONOMIDAE			71	10	7
2/14/2020	D2	TABANIDAE	TABANUS	SPP.	1	1	8.5
2/14/2020	D2	TIPULIDAE	DICRANOTA	SPP.	1	1	5.9
2/14/2020	D2	COENAGRIONIDAE	ARGIA	SPP.	14	10	8.3
2/14/2020	D2	LIBELLULIDAE	PLATHEMIS	SPP.	3	3	9.4
2/14/2020	D2	PHYSIDAE	PHYSA	SPP.	1	1	8.7
2/14/2020	D2	CORBICULIDAE	CORBICULA	FLUMINEA	1	1	6.6
2/14/2020	D2	BELOSTOMATIDAE	BELOSTOMA	SPP.	1	1	9.5
2/14/2020	R1	BAETIDAE	BAETIS	SPP.	11	10	5
2/14/2020	R1	EPHEMERELLIDAE	DANNELLA	SIMPLEX	2	1	3.4
2/14/2020	R1	HEPTAGENIIDAE	MACCAFFERTIUM	MODESTUM	146	10	5.7
2/14/2020	R1	HYDROPSYCHIDAE	CHEUMATOPSYCHE	SPP.	9	3	6.6
2/14/2020	R1	HYDROPSYCHIDAE	HYDROPSYCHE	BETTENI	3	3	7.9

2/14/2020	R1	PHILOPOTAMIDAE	CHIMARRA	SPP.	20	10	3.3
2/14/2020	R1	DYTISCIDAE	NEOCLYPEODYTES	SPP.	1	1	5
2/14/2020	R1	PHILODACTYLIDAE	ANCHYTARUS	BICOLOR	1	1	2.4
2/14/2020	R1	CHIRONOMIDAE			67	10	7
2/14/2020	R1	SIMULIDAE	SIMULIUM	SPP.	3	3	9.5
2/14/2020	R1	TIPULIDAE	PILARIA	SPP.	1	1	8.2
2/14/2020	R1	COENAGRIONIDAE	ARGIA	SPP.	1	1	8.3
2/14/2020	R1	ERPOBDELLIDAE	ERPOBDELLA/MOOREOBDELLA		3	3	8.6
2/14/2020	R2	HEPTAGENIIDAE	MACCAFFERTIUM	MODESTUM	61	10	5.7
2/14/2020	R2	HYDROPSYCHIDAE	CHEUMATOPSYCHE	SPP.	19	10	6.6
2/14/2020	R2	HYDROPSYCHIDAE	HYDROPSYCHE	BETTENI	7	3	7.9
2/14/2020	R2	PHILOPOTAMIDAE	CHIMARRA	SPP.	21	10	3.3
2/14/2020	R2	CHRYSOMELIDAE	DONACIA	SPP.	1	1	5
2/14/2020	R2	PHILODACTYLIDAE	ANCHYTARUS	BICOLOR	1	1	2.4
2/14/2020	R2	CHIRONOMIDAE			53	10	7
2/14/2020	R2	SIMULIIDAE	SIMULIUM	SPP.	7	3	9.5
2/14/2020	R2	COENAGRIONIDAE	ARGIA	SPP.	2	1	8.3
2/14/2020	R2	GOMPHIGAE	PROGOMPHUS	OBSCURUS	2	1	8.2
2/14/2020	R2	ERPOBDELLIDAE	ERPOBDELLA/MOOREOBDELLA		7	3	8.6
2/14/2020	P1	HYDROPSYCHIDAE	CHEUMATOPSYCHE	SPP.	2	1	6.6
2/14/2020	P1	CHIRONOMIDAE			71	10	7
2/14/2020	P1	SIMULIDAE	PROSIMULIUM	SPP.	3	3	8.5
2/14/2020	P1	TIPULIDAE	TIPULA	SPP.	1	1	9.5
2/14/2020	P1	COENAGRIONIDAE	ARGIA	SPP.	1	1	8.3
2/14/2020	P1	GOMPHIDAE	PROGOMPHUS	OBSCURUS	1	1	8.2
2/14/2020	P1	HAPLOTAXIDAE	HAPLOTAXIS	GORDIOIDES	1	1	3.6
2/14/2020	P1	PHYSIDAE	PHYSA	SPP.	1	1	8.7
7/28/2020	A1	EPHEMERELLIDAE	DANNELLA	SIMPLEX	35	10	3.4
7/28/2020	A1	HEPTAGENIIDAE	MACCAFFERTIUM	MODESTUM	27	10	5.7
7/28/2020	A1	CHIRONOMIDAE			26	10	7
7/28/2020	A1	TABANIDAE	TABANUS	SPP.	1	1	8.5
7/28/2020	A1	COENAGRIONIDAE	ARGIA	SPP.	6	3	8.3
7/28/2020	A1	GOMPHIDAE	OPHIOGOMPHUS	SPP.	1	1	5.9
7/28/2020	A1	LIBELLULIDAE			1	1	9.4
7/28/2020	A1	ERPOBDELLIDAE	ERPOBDELLA/MOOREOBDELLA		1	1	8.6
7/28/2020	A2	HEPTAGENIIDAE	MACCAFFERTIUM	MODESTUM	1	1	5.7
7/28/2020	A2	HYDROPSYCHIDAE	CHEUMATOPSYCHE	SPP.	1	1	6.6
7/28/2020	A2	HYDROPSYCHIDAE	HYDROPSYCHE	BETTENI	1	1	7.9
7/28/2020	A2	CHIRONOMIDAE			89	10	7
7/28/2020	A2	COENAGRIONIDAE	ARGIA	SPP.	5	3	8.3
7/28/2020	A2	LIBELLULIDAE			2	1	9.4
7/28/2020	A2	ERPOBDELLIDAE	ERPOBDELLA/MOOREOBDELLA		1	1	8.6
7/28/2020	A3	EPHEMERELLIDAE			1	1	4.4

7/28/2020	A3	HYDROPSYCHIDAE	CHEUMATOPSYCHE	SPP.	6	3	6.6
7/28/2020	A3	HYDROPSYCHIDAE	HYDROPSYCHE	BETTENI	3	3	7.9
7/28/2020	A3	CHIRONOMIDAE			109	10	7
7/28/2020	A3	TABANIDAE	TABANUS	SPP.	1	1	8.5
7/28/2020	A3	COENAGRIONIDAE	ARGIA	SPP.	22	10	8.3
7/28/2020	A3	GOMPHIDAE	OPHIOGOMPHUS	SPP.	1	1	5.9
7/28/2020	A3	LIBELLULIDAE			27	10	9.4
7/28/2020	A3	PHYSIDAE	PHYSA	SPP.	1	1	8.7
7/28/2020	A4	EPHEMERELLIDAE	EPHEMERELLA	DOROTHEA	1	1	3.3
7/28/2020	A4	CHIRONOMIDAE			102	10	7
7/28/2020	A4	TIPULIDAE	PILARIA	SPP.	1	1	8.2
7/28/2020	A4	CALOPTERYGIDAE	CALOPTERYX	SPP.	2	1	7.5
7/28/2020	A4	COENAGRIONIDAE	ARGIA	SPP.	17	10	8.3
7/28/2020	C1	HEPTAGENIIDAE	MACCAFFERTIUM	MODESTUM	3	3	5.7
7/28/2020	C1	PERLIDAE	ECCOPTURA	XANTHENES	17	10	4.7
7/28/2020	C1	HYDROPSYCHIDAE	CHEUMATOPSYCHE	SPP.	2	1	6.6
7/28/2020	C1	LEPIDOSTOMATIDAE	LEPIDOSTOMA	SPP.	3	3	1
7/28/2020	C1	PHILODACTYLIDAE	ANCHYTARUS	BICOLOR	6	3	2.4
7/28/2020	C1	CHIRONOMIDAE			91	10	7
7/28/2020	C1	TABANIDAE	TABANUS	SPP.	1	1	8.5
7/28/2020	C1	TIPULIDAE	PILARIA	SPP.	2	1	8.2
7/28/2020	C1	TIPULIDAE	TIPULA	SPP.	3	3	9.5
7/28/2020	C1	CALOPTERYGIDAE	CALOPTERYX	SPP.	1	1	7.5
7/28/2020	C1	CORDULEGASTRIDAE	CORDULEGASTER	SPP.	1	1	5.7
7/28/2020	C1	GOMPHIDAE	HAGENIUS	BREVISTYLUS	2	1	4.4
7/28/2020	C1	GOMPHIDAE	PROGOMPHUS	OBSCURUS	6	3	8.2
7/28/2020	C1	HAPLOTAXIDAE	HAPLOTAXIS	GORDIOIDES	11	10	3.6
7/28/2020	C2	HEPTAGENIIDAE	MACCAFFERTIUM	MODESTUM	7	3	5.7
7/28/2020	C2	CHLORPERLIDAE	ALLOPERLA	SPP.	3	3	1
7/28/2020	C2	PERLIDAE	ECCOPTURA	XANTHENES	11	10	4.7
7/28/2020	C2	PERLIDAE	PERLINELLA	EPHYRE	4	3	1.3
7/28/2020	C2	HYDROPSYCHIDAE	CHEUMATOPSYCHE	SPP.	6	3	6.6
7/28/2020	C2	HYDROPSYCHIDAE	HYDROPSYCHE	BETTENI	5	3	7.9
7/28/2020	C2	LIMNIPHILIDAE	PYCNOPSYCHE	SCABRIPENNIS	11	10	2.5
7/28/2020	C2	DYTISCIDAE	NEOCLYPEODYTES	SPP.	2	1	5
7/28/2020	C2	PHILODACTYLIDAE	ANCHYTARUS	BICOLOR	2	1	2.4
7/28/2020	C2	PSEPHENIDAE	PSEPHENUS	HERRICKI	1	1	2.3
7/28/2020	C2	CHIRONOMIDAE			2	1	7
7/28/2020	C2	TABANIDAE	TABANUS	SPP.	1	1	8.5
7/28/2020	C2	TIPULIDAE	HEXATOMA	SPP.	2	1	5.7
7/28/2020	C2	TIPULIDAE	PILARIA	SPP.	6	3	8.2
7/28/2020	C2	TIPULIDAE	TIPULA	SPP.	2	1	9.5
7/28/2020	C2	CORDULEGASTRIDAE	CORDULEGASTER	SPP.	1	1	5.7

7/28/2020	C2	GOMPHIDAE	HAGENIUS	BREVISTYLUS	2	1	4.4
7/28/2020	C2	GOMPHIDAE	OPHIOGOMPHUS	SPP.	1	1	5.9
7/28/2020	C2	GOMPHIDAE	PROGOMPHUS	OBSCURUS	1	1	8.2
7/28/2020	C2	HAPLOTAXIDAE	HAPLOTAXIS	GORDIOIDES	10	10	3.6
7/28/2020	D1	BAETIDAE	BAETIS	SPP.	1	1	5
7/28/2020	D1	EPHEMERELLIDAE	DANNELLA	SIMPLEX	2	1	3.4
7/28/2020	D1	HEPTAGENIIDAE	MACCAFFERTIUM	MODESTUM	5	3	5.7
7/28/2020	D1	HYDROPSYCHIDAE	CHEUMATOPSYCHE	SPP.	2	1	6.6
7/28/2020	D1	PHILODACTYLIDAE	ANCHYTARUS	BICOLOR	1	1	2.4
7/28/2020	D1	CHIRONOMIDAE			32	10	7
7/28/2020	D1	TIPULIDAE	TIPULA	SPP.	1	1	9.5
7/28/2020	D1	COENAGRIONIDAE	ARGIA	SPP.	14	10	8.3
7/28/2020	D1	GOMPHIDAE	OPHIOGOMPHUS	SPP.	1	1	5.9
7/28/2020	D1	GOMPHIDAE	PROGOMPHUS	OBSCURUS	1	1	8.2
7/28/2020	D1	LIBELLULIDAE	PLATHEMIS	SPP.	1	1	9.4
7/28/2020	D1	HAPLOTAXIDAE	HAPLOTAXIS	GORDIOIDES	1	1	3.6
7/28/2020	D1	ERPOBDELLIDAE	ERPOBDELLA/MOOREOBDELLA		1	1	8.6
7/28/2020	D2	BAETIDAE	BAETIS	SPP.	2	1	5
7/28/2020	D2	HEPTAGENIIDAE	MACCAFFERTIUM	MODESTUM	1	1	5.7
7/28/2020	D2	HYDROPSYCHIDAE	CHEUMATOPSYCHE	SPP.	3	3	6.6
7/28/2020	D2	HYDROPSYCHIDAE	HYDROPSYCHE	BETTENI	7	3	7.9
7/28/2020	D2	CHIRONOMIDAE			46	10	7
7/28/2020	D2	CALOPTERYGIDAE	CALOPTERYX	SPP.	3	3	7.5
7/28/2020	D2	COENAGRIONIDAE	ARGIA	SPP.	12	10	8.3
7/28/2020	D2	GOMPHIDAE	PROGOMPHUS	OBSCURUS	1	1	8.2
7/28/2020	D2	LIBELLULIDAE			7	3	9.4
7/28/2020	D2	CORBICULIDAE	CORBICULA	FLUMINEA	1	1	6.6
7/28/2020	R1	EPHEMERELLIDAE	DANNELLA	SIMPLEX	4	3	3.4
7/28/2020	R1	HEPTAGENIIDAE	MACCAFFERTIUM	MODESTUM	31	10	5.7
7/28/2020	R1	PHILOPOTAMIDAE	CHIMARRA	SPP.	1	1	3.3
7/28/2020	R1	CHIRONOMIDAE			32	10	7
7/28/2020	R1	AESHNIDAE	NASIAESCHNA	PENTACANTHA	1	1	6.6
7/28/2020	R1	ERPOBDELLIDAE	ERPOBDELLA/MOOREOBDELLA		4	3	8.6
7/28/2020	R2	HEPTAGENIIDAE	MACCAFFERTIUM	MODESTUM	27	10	5.7
7/28/2020	R2	HYDROPSYCHIDAE	CHEUMATOPSYCHE	SPP.	2	1	6.6
7/28/2020	R2	PHILODACTYLIDAE	ANCHYTARUS	BICOLOR	2	1	2.4
7/28/2020	R2	CHIRONOMIDAE			12	10	7
7/28/2020	R2	GOMPHIDAE	PROGOMPHUS	OBSCURUS	1	1	8.2
7/28/2020	R2	ERPOBDELLIDAE	ERPOBDELLA/MOOREOBDELLA		1	1	8.6
7/28/2020	P1	HEPTAGENIIDAE	MACCAFFERTIUM	MODESTUM	3	3	5.7
7/28/2020	P1	HYDROPSYCHIDAE	CHEUMATOPSYCHE	SPP.	5	3	6.6
7/28/2020	P1	HYDROPSYCHIDAE	HYDROPSYCHE	BETTENI	3	3	7.9
7/28/2020	P1	CHIRONOMIDAE			52	10	7

7/28/2020	P1	TABANIDAE	TABANUS	SPP.	2	1	8.5
7/28/2020	P1	TIPULIDAE	TIPULA	SPP.	2	1	9.5
7/28/2020	P1	COENAGRIONIDAE	ARGIA	SPP.	8	3	8.3
7/28/2020	P1	GOMPHIDAE	PROGOMPHUS	OBSCURUS	1	1	8.2
7/28/2020	P1	LIBELLULIDAE	PLATHEMIS	SPP.	1	1	9.4
7/28/2020	P1	PHYSIDAE	PHYSA	SPP.	1	1	8.7

Appendix A2. Total count, taxa richness, EPT richness, NCBI scores, and bioclassification rating for all sites and dates of samples collected at the Reedy Creek Watershed from 2016-2020. Bioclassification rating is based on small stream criteria in the Piedmont region (NCDEQ, 2016).

DATE	SEASON	SITE	TOTAL COUNT	TAXA RICHNESS	EPT RICHNESS	NCBI	RATING
7/28/2016	SUMMER	A1	42	11	4	7.3	POOR
7/28/2016	SUMMER	A2	66	17	6	4.63	GOOD
7/28/2016	SUMMER	A3	65	17	7	6.25	FAIR
7/28/2016	SUMMER	A4	7	7	1	6.66	FAIR
7/28/2016	SUMMER	R1	32	13	4	6.6	FAIR
7/28/2016	SUMMER	R2	33	8	4	5.84	GOOD-FAIR
7/28/2016	SUMMER	P1	10	7	1	7.01	POOR
7/28/2016	SUMMER	C1	52	13	5	6.64	FAIR
7/28/2016	SUMMER	C2	26	12	5	4.97	GOOD
7/28/2016	SUMMER	D1	3	3	0	6.17	FAIR
7/28/2016	SUMMER	D2	28	7	0	7.83	POOR
11/14/2016	FALL	A1	40	5	2	4.24	EXCELLENT
11/14/2016	FALL	A2	92	16	7	5.71	GOOD-FAIR
11/14/2016	FALL	A3	10	3	1	5.84	GOOD-FAIR
11/14/2016	FALL	A4	3	1	1	3.3	EXCELLENT
11/14/2016	FALL	R1	14	4	3	5.64	GOOD-FAIR
11/14/2016	FALL	R2	9	6	3	5.65	GOOD-FAIR
11/16/2016	FALL	C2	56	12	8	4.66	GOOD
11/16/2016	FALL	D1	5	2	0	7.38	POOR
11/16/2016	FALL	D2	5	3	0	5.96	FAIR
11/16/2016	FALL	P1	3	3	0	6.87	FAIR
3/17/2017	SPRING	A1	606	23	8	5.14	GOOD
3/17/2017	SPRING	A2	94	17	7	5.33	GOOD-FAIR
3/17/2017	SPRING	A3	55	14	8	4.46	GOOD
3/17/2017	SPRING	A4	60	13	8	4.19	EXCELLENT
3/17/2017	SPRING	C1	56	7	5	4.45	GOOD
3/17/2017	SPRING	C2	80	19	10	4.23	EXCELLENT
3/17/2017	SPRING	D2	18	6	3	3.84	EXCELLENT
3/17/2017	SPRING	R1	27	8	6	4.55	GOOD
3/17/2017	SPRING	R2	23	7	4	5.79	GOOD-FAIR
3/17/2017	SPRING	P1	13	7	1	6.63	FAIR
6/20/2017	SUMMER	A1	12	7	1	5.85	GOOD-FAIR
6/20/2017	SUMMER	A2	4	3	0	7.67	POOR
6/20/2017	SUMMER	A3	34	10	5	4.28	EXCELLENT
6/20/2017	SUMMER	A4	28	3	2	3.37	EXCELLENT
6/21/2017	SUMMER	C2	91	14	5	3.81	EXCELLENT
6/21/2017	SUMMER	D1	13	6	4	6.35	FAIR

6/21/2017	SUMMER	D2	28	9	4	6.31	FAIR
6/20/2017	SUMMER	R1	10	7	3	6.49	FAIR
6/20/2017	SUMMER	R2	14	5	1	6.83	FAIR
6/21/2017	SUMMER	P1	39	10	5	6.12	FAIR
10/18/2017	FALL	A1	60	12	3	7.05	POOR
10/18/2017	FALL	A2	53	7	1	7.84	POOR
10/18/2017	FALL	A3	26	8	1	5.94	FAIR
10/18/2017	FALL	A4	13	3	2	2.74	EXCELLENT
10/19/2017	FALL	C2	62	11	4	6.14	FAIR
10/19/2017	FALL	D1	23	6	2	7.03	POOR
10/19/2017	FALL	D2	39	9	2	6.01	FAIR
10/19/2017	FALL	P1	4	2	0	7.58	POOR
10/18/2017	FALL	R1	35	7	1	7.07	POOR
10/18/2017	FALL	R2	84	11	4	6.45	FAIR
2/19/2018	WINTER	A1	13	7	4	6.77	FAIR
2/19/2018	WINTER	A3	45	13	6	4.27	EXCELLENT
2/19/2018	WINTER	A4	14	3	2	3.8	EXCELLENT
2/19/2018	WINTER	C2	51	16	8	4.44	GOOD
2/19/2018	WINTER	R1	10	4	1	6.52	FAIR
2/19/2018	WINTER	R2	34	10	5	6	FAIR
2/19/2018	WINTER	P1	19	9	4	5.55	GOOD-FAIR
8/17/2018	SUMMER	A2	175	8	0	7.54	POOR
8/17/2018	SUMMER	A3	166	5	1	6.56	FAIR
8/17/2018	SUMMER	A4	48	10	1	7.68	POOR
8/16/2018	SUMMER	C1	10	6	2	5.35	GOOD-FAIR
8/16/2018	SUMMER	C2	47	17	7	4.61	GOOD
8/16/2018	SUMMER	D1	125	10	3	7.19	POOR
8/17/2018	SUMMER	R1	7	4	2	6.35	FAIR
8/17/2018	SUMMER	R2	20	9	3	6.52	FAIR
11/8/2018	FALL	A1	44	7	4	6.17	FAIR
11/8/2018	FALL	A2	14	6	2	5.13	GOOD
11/8/2018	FALL	A3	21	3	2	8.46	POOR
11/8/2018	FALL	A4	42	7	4	6.29	FAIR
11/8/2018	FALL	C1	100	13	7	5.8	GOOD-FAIR
11/8/2018	FALL	C2	58	17	8	3.55	EXCELLENT
11/8/2018	FALL	D1	188	8	2	7.53	POOR
11/8/2018	FALL	D2	188	8	2	7.53	POOR
11/8/2018	FALL	P1	33	3	1	6.95	POOR
2/26/2019	WINTER	A1	66	6	3	7.2	POOR
2/26/2019	WINTER	A2	144	7	2	7.19	POOR
2/26/2019	WINTER	A3	48	6	3	7.33	POOR
2/26/2019	WINTER	A4	89	7	3	6.19	FAIR
2/25/2019	WINTER	C1	60	11	7	4.82	GOOD

2/25/2019	WINTER	C2	68	11	7	3.4	EXCELLENT
2/25/2019	WINTER	D1	96	7	2	6.86	FAIR
2/25/2019	WINTER	D2	84	5	1	5.84	GOOD-FAIR
2/26/2019	WINTER	R1	16	4	2	6.46	FAIR
2/26/2019	WINTER	R2	41	3	0	6.89	FAIR
2/25/2019	WINTER	P1	27	5	1	7.58	POOR
7/17/2019	SUMMER	A1	174	12	6	6.88	FAIR
7/17/2019	SUMMER	A2	87	8	3	7.4	POOR
7/17/2019	SUMMER	A3	311	9	3	6.83	FAIR
7/17/2019	SUMMER	A4	67	10	4	7.34	POOR
7/15/2019	SUMMER	C1	126	11	7	6.5	FAIR
7/15/2019	SUMMER	C2	27	8	6	4.83	GOOD
7/15/2019	SUMMER	D1	54	7	2	7.53	POOR
7/15/2019	SUMMER	D2	49	9	2	7.07	POOR
7/17/2019	SUMMER	R1	81	10	4	6.42	FAIR
7/17/2019	SUMMER	R2	146	6	4	6.76	FAIR
7/15/2019	SUMMER	P1	135	9	3	7.15	POOR
11/22/2019	FALL	A1	70	9	4	6.19	FAIR
11/22/2019	FALL	A2	78	11	5	6.92	POOR
11/22/2019	FALL	A3	20	6	0	8.26	POOR
11/22/2019	FALL	A4	31	2	0	7.3	POOR
11/20/2019	FALL	C1	66	10	3	7.11	POOR
11/20/2019	FALL	C2	17	6	2	5.65	GOOD-FAIR
11/20/2019	FALL	D1	22	9	4	5.61	GOOD-FAIR
11/20/2019	FALL	D2	36	8	4	7.46	POOR
11/22/2019	FALL	R1	166	6	4	5.15	GOOD
11/22/2019	FALL	R2	87	11	6	6.33	FAIR
11/20/2019	FALL	P1	7	3	0	6.58	FAIR
2/14/2020	WINTER	A1	84	9	4	6.27	FAIR
2/14/2020	WINTER	A2	108	10	4	7.05	POOR
2/14/2020	WINTER	A3	77	6	1	6.74	FAIR
2/14/2020	WINTER	A4	70	8	1	7.76	POOR
2/14/2020	WINTER	C1	67	15	8	5.24	GOOD-FAIR
2/14/2020	WINTER	C2	85	13	5	5.73	GOOD-FAIR
2/14/2020	WINTER	D1	62	8	3	7.3	POOR
2/14/2020	WINTER	D2	100	10	1	7.58	POOR
2/14/2020	WINTER	R1	268	13	6	5.88	FAIR
2/14/2020	WINTER	R2	181	11	4	6.19	FAIR
2/14/2020	WINTER	P1	81	8	1	7.39	POOR
7/28/2020	SUMMER	A1	103	10	4	6	FAIR
7/28/2020	SUMMER	A2	100	7	3	7.39	POOR
7/28/2020	SUMMER	A3	171	9	3	7.95	POOR
7/28/2020	SUMMER	A4	123	5	1	7.48	POOR

7/28/2020	SUMMER	C1	149	14	4	5.38	GOOD-FAIR
7/28/2020	SUMMER	C2	80	20	7	4.49	GOOD
7/28/2020	SUMMER	D1	63	13	4	7.05	POOR
7/28/2020	SUMMER	D2	83	10	4	7.58	POOR
7/28/2020	SUMMER	R1	73	6	3	6.18	FAIR
7/28/2020	SUMMER	R2	45	6	2	6.37	FAIR
7/28/2020	SUMMER	P1	78	10	3	7.4	POOR

APPENDIX B: BIOMASS

Appendix B1. Length-mass regression equations based on total body length (mm). Equations are in the form of DM = a*L^b where DM = dry mass (mg), L = length (mm) and a and b are fitted constants based on previous published findings (Benke et al. 1999). Other sources include ADH = Alexander D. Huryn, LAS = Leonard A. Smock, ACB = Arthur C. Benke, and JBW = J. Bruce Wallace.

TAXON	***a***	***b***	**State**	**Source**
EPHEMEROPTERA				
Ameletidae				
Ameletus sp.	0.0077	2.588	VA	LAS
Baetidae				
Baetis sp.	0.0076	2.691	NC	ADH and JBW
Ephemerellidae				
Ephemerella sp.	0.0097	2.663	GA	ACB
Heptageniidae				
Stenonema modestum	0.0078	2.871	NC	Smock 1980
Stenonema spp.	0.0128	2.616	GA	ACB
Leptophlebiidae				
Habrophlebia vibrans	0.0047	2.566	NC	ADH and JBW
Paraleptophlebia sp.	0.0038	2.918	NC	ADH and JBW
PLECOPTERA				
Capniidae				
Allocapnia sp.	0.0040	2.487	NC	ADH and JBW
Nemouridae				
Amphinemura sp.	0.0040	2.975	VA	LAS
Perlidae				
Eccoptura xanthenes	0.0030	3.232	NC	LAS
Perlinella drymo	0.0034	3.123	VA	LAS

Isoperla sp.	0.0100	2.658	NC	ADH and JBW
TRICHOPTERA				
Hydropsychidae				
Cheumatopsyche sp.	0.0049	2.620	NC	LAS
Hydropsyche spp.	0.0051	2.824	NC	LAS
Lepidostomatidae				
Lepidostoma sp.	0.0079	2.649	VA	LAS
Limnephilidae				
Ironoquia parvula	0.0041	2.933	VA	LAS
P. scabripennis	0.0049	2.850	VA	LAS
Odontoceridae				
Psilotreta sp.	0.0082	2.735	VA	LAS
Philopotamidae				
Chimarra sp.	0.0049	2.480	NC	LAS
Phryganeidae				
Ptilostomis sp.	0.0054	2.811	VA	LAS
Rhyacophilidae				
Rhyacophila sp.	0.0099	2.480	VA	LAS

APPENDIX B: BIOMASS

Appendix B2. Raw magnification measurements for the EPT taxa across all sites from 2016-2020. The symbol '#' represents the species count for the respective date and site. The symbol 'X' represents the magnification level the species length was recorded at. **Note highlighted cells represent species that were not able to be measured due to damage.*

DATE	SITE	GENUS	SPECIES	#	X 1	X 2	X 3	X 4	X 5	X 6	X 7	X 8	X 9	X 10
7/28/2016	A1	MACCAFFERTIUM	MODESTUM	3	10	10								
7/28/2016	A1	STENONEMA	FEMORATUM	2	10									
7/28/2016	A1	LEPIDOSTOMA	SPP.	2	10									
7/28/2016	A1	IRONOQUIA	PUNCTACISSIMA	1	10									
7/28/2016	A2	HABROPHLEBIA	SPP.	3	10	10								
7/28/2016	A2	PERLINELLA	DRYMO	2	10	10								
7/28/2016	A2	GOERA	CALCARATA	1	8									
7/28/2016	A2	CHEUMATOPSYCHE	SPP.	8	8	8	8	8	8	8	8	8		
7/28/2016	A2	LEPIDOSTOMA	SPP.	15	10	10	10	10	10					
7/28/2016	A2	OLIGOSTOMIS	SPP.	2										
7/28/2016	A3	STENONEMA	FEMORATUM	1	10									
7/28/2016	A3	HABROPHLEBIA	SPP.	1	10									
7/28/2016	A3	ALLOPERLA	SPP.	1										
7/28/2016	A3	PERLINELLA	DRYMO	4	10	10	10							
7/28/2016	A3	HYDROPSYCHE	BETTENI	1	10									
7/28/2016	A3	LEPIDOSTOMA	SPP.	3										

7/28/2016	A3	OLIGOSTOMIS	SPP.	2	10									
7/28/2016	A4	LEPIDOSTOMA	SPP.	1										
7/28/2016	R1	BAETIS	INTERCALARIS	3	10	10								
7/28/2016	R1	MACCAFFERTIUM	MODESTUM	3	10	10								
7/28/2016	R1	STENONEMA	FEMORATUM	2	10	10								
7/28/2016	R1	PTILOSTOMIS	SPP.	2	8	8								
7/28/2016	R2	BAETIS	INTERCALARIS	2	10									
7/28/2016	R2	MACCAFFERTIUM	MODESTUM	2	10	10								
7/28/2016	R2	CHEUMATOPSYCHE	SPP.	4	8	8	8	16						
7/28/2016	R2	DIPLECTRONA	MODESTA	3	8	8	10							
7/28/2016	P1	CHIMARRA	SPP.	1										
7/28/2016	C1	BAETIS	INTERCALARIS	1										
7/28/2016	C1	PERLINELLA	DRYMO	2	10	10								
7/28/2016	C1	DIPLECTRONA	MODESTA	1	10									
7/28/2016	C1	HYDROPSYCHE	BETTENI	5										
7/28/2016	C1	LEPIDOSTOMA	SPP.	1										
7/28/2016	C2	MACCAFFERTIUM	MODESTUM	1	8									
7/28/2016	C2	PERLINELLA	DRYMO	2	8	8								
7/28/2016	C2	HYDROPSYCHE	BETTENI	2	8	8								
7/28/2016	C2	LEPIDOSTOMA	SPP.	1										
7/28/2016	C2	NEOPHYLAX	OLIGIUS	9										

11/14/2016	A1	MACCAFFERTIUM	MODESTUM	1	10									
11/14/2016	A1	ALLOCAPNIA	SPP.	36	10	10	10	10	10	10	10	10	10	10
11/14/2016	A2	EURYLOPHELLA	DORIS	1	10									
11/14/2016	A2	MACCAFFERTIUM	MODESTUM	4	10	10	10	8						
11/14/2016	A2	ALLOCAPNIA	SPP.	53	10	10	10	10	10	10	10	10	10	10
11/14/2016	A2	ECCOPTURA	XANTHENES	1	10									
11/14/2016	A2	PERLINELLA	DRYMO	1	10									
11/14/2016	A2	CHEUMATOPSYCHE	SPP.	1	10									
11/14/2016	A2	HYDROPSYCHE	BETTENI	2	8	8								
11/14/2016	A3	ALLOCAPNIA	SPP.	6	10	10	10	10	10					
11/14/2016	A4	ALLOCAPNIA	SPP.	3	10	10								
11/14/2016	R1	MACCAFFERTIUM	MODESTUM	3	10	10	10							
11/14/2016	R1	ALLOCAPNIA	SPP.	7	10									
11/14/2016	R1	HYDROPSYCHE	BETTENI	3	8	8	8							
11/14/2016	R2	PERLINELLA	DRYMO	1	8									
11/14/2016	R2	PERLINELLA	EPHYRE	1	10									
11/14/2016	R2	HYDROPSYCHE	BETTENI	3	10	10	10							
11/16/2016	C2	EURYLOPHELLA	DORIS	1	10									
11/16/2016	C2	MACCAFFERTIUM	MODESTUM	1	10									
11/16/2016	C2	ALLOCAPNIA	SPP.	6	10	10	10	10	10					
11/16/2016	C2	PERLINELLA	DRYMO	2	10	10								

11/16/2016	C2	PERLINELLA	EPHYRE	1	10									
11/16/2016	C2	DIPLECTRONA	MODESTA	2										
11/16/2016	C2	HYDROPSYCHE	BETTENI	6	10	10	10	8	10	10				
11/16/2016	C2	PYCNOPSYCHE	SCABRIPENNIS	1										
3/17/2017	A1	BAETIS	INTERCALARIS	9	8	10	10	10	10	10	10			
3/17/2017	A1	BAETIS	SPP.	294	10	10	10	10	10	10	10	10	10	10
3/17/2017	A1	EPHEMERELLA	DOROTHEA	74	10	10	10	10	10	10	10	10	10	10
3/17/2017	A1	MACCAFFERTIUM	MODESTUM	2	10	10	10							
3/17/2017	A1	ALLOPERLA	SPP.	28	10	10	10	10	10	10	10	10	10	10
3/17/2017	A1	APHINEMURA	SPP.	21	10	10	10	10	10	10	10	10	10	10
3/17/2017	A1	ISOPERLA	TRANSMARINA	30	10	10	10	10	10	10	10	10	10	10
3/17/2017	A1	IRONOQUIA	PUNCTACISSIMA	2	8	8								
3/17/2017	A1	NEOPHYLAX	OLIGIUS	1										
3/17/2017	A2	BAETIS	INTERCALARIS	4	10	10								
3/17/2017	A2	EPHEMERELLA	DOROTHEA	1	10									
3/17/2017	A2	MACCAFFERTIUM	MODESTUM	1	10									
3/17/2017	A2	ALLOPERLA	SPP.	8	10	10	10	10	10	10				
3/17/2017	A2	APHINEMURA	SPP.	1	10									
3/17/2017	A2	LEPIDOSTOMA	SPP.	3	10	8	8							
3/17/2017	A2	NEOPHYLAX	OLIGIUS	20	10	10								
3/17/2017	A3	BAETIS	INTERCALARIS	4	10	10	8	8						

3/17/2017	A3	EPHEMERELLA	DOROTHEA	4	10	10	10	10						
3/17/2017	A3	MACCAFFERTIUM	MODESTUM	1	10									
3/17/2017	A3	ALLOPERLA	SPP.	8	10	10	10	10	10	10	10	10		
3/17/2017	A3	APHINEMURA	SPP.	3	10	10	10							
3/17/2017	A3	DIPLOPERLA	DUPLICATA	1	10									
3/17/2017	A3	LEPIDOSTOMA	SPP.	1	8									
3/17/2017	A3	NEOPHYLAX	OLIGIUS	15	10									
3/17/2017	A4	BAETIS	INTERCALARIS	3	10	10	10							
3/17/2017	A4	EPHEMERELLA	DOROTHEA	1	10									
3/17/2017	A4	ALLOPERLA	SPP.	1	10									
3/17/2017	A4	APHINEMURA	SPP.	15	10	10	10	10	10	10	10	10	10	10
3/17/2017	A4	ISOPERLA	TRANSMARINA	5	10	10	10	10	10					
3/17/2017	A4	CHEUMATOPSYCHE	SPP.	1	8									
3/17/2017	A4	HYDROPSYCHE	BETTENI	1	8									
3/17/2017	A4	NEOPHYLAX	OLIGIUS	20	10	10	10	10	10					
3/17/2017	C1	EPHEMERELLA	DOROTHEA	1	10									
3/17/2017	C1	MACCAFFERTIUM	MODESTUM	2	8	8								
3/17/2017	C1	PERLINELLA	DRYMO	2	10	10								
3/17/2017	C1	ANISOCENTROPUS	PYRALOIDES	1	8									
3/17/2017	C1	NEOPHYLAX	OLIGIUS	29	8	8	8							
3/17/2017	C2	BAETIS	INTERCALARIS	1										

3/17/2017	C2	DANNELLA	SIMPLEX	2	10	10								
3/17/2017	C2	EPHEMERELLA	DOROTHEA	2	10	10								
3/17/2017	C2	MACCAFFERTIUM	MODESTUM	2	10	10								
3/17/2017	C2	ALLOPERLA	SPP.	1	10									
3/17/2017	C2	PERLINELLA	DRYMO	2	10									
3/17/2017	C2	APHINEMURA	SPP.	1	10									
3/17/2017	C2	CHEUMATOPSYCHE	SPP.	2	10	8								
3/17/2017	C2	LEPIDOSTOMA	SPP.	1	10									
3/17/2017	C2	NEOPHYLAX	OLIGIUS	37	10	10								
3/17/2017	D2	MACCAFFERTIUM	MODESTUM	2	10	10								
3/17/2017	D2	LEPIDOSTOMA	SPP.	1	10									
3/17/2017	D2	NEOPHYLAX	OLIGIUS	10										
3/17/2017	R1	BAETIS	INTERCALARIS	16	8	8	8	8	8	8	8	8	8	8
3/17/2017	R1	EPHEMERELLA	DOROTHEA	2	10	10								
3/17/2017	R1	MACCAFFERTIUM	MODESTUM	1	8									
3/17/2017	R1	PERLINELLA	DRYMO	1	8									
3/17/2017	R1	APHINEMURA	SPP.	1	10									
3/17/2017	R1	NEOPHYLAX	OLIGIUS	3	10									
3/17/2017	R2	BAETIS	INTERCALARIS	2	10	10								
3/17/2017	R2	EPHEMERELLA	DOROTHEA	5	10	10	10	10	10					
3/17/2017	R2	MACCAFFERTIUM	MODESTUM	4	8	10	10	10						

3/17/2017	R2	CHEUMATOPSYCHE	SPP.	1	8									
3/17/2017	P1	MACCAFFERTIUM	MODESTUM	1	10									
6/20/2017	A1	IRONOQUIA	PUNCTACISSIMA	1	10									
6/20/2017	A3	MACCAFFERTIUM	MODESTUM	1	10									
6/20/2017	A3	PERLINELLA	DRYMO	1	10									
6/20/2017	A3	CHEUMATOPSYCHE	SPP.	1	8									
6/20/2017	A3	HYDROPSYCHE	BETTENI	1	8									
6/20/2017	A3	NEOPHYLAX	OLIGIUS	21										
6/20/2017	A4	HYDROPSYCHE	BETTENI	1	10									
6/20/2017	A4	NEOPHYLAX	OLIGIUS	26										
6/20/2017	R1	MACCAFFERTIUM	MODESTUM	1	10									
6/20/2017	R1	CHEUMATOPSYCHE	SPP.	2	10	10								
6/20/2017	R1	HYDROPSYCHE	BETTENI	1	10									
6/20/2017	R2	HYDROPSYCHE	BETTENI	3	8	10	10							
6/20/2017	P1	MACCAFFERTIUM	MODESTUM	5	10	10	10	10	10					
6/20/2017	P1	CHEUMATOPSYCHE	SPP.	18	8	10	10	10	10	10	10	10	10	10
6/20/2017	P1	HYDROPSYCHE	BETTENI	1	8									
6/20/2017	P1	OLIGOSTOMIS	SPP.	1										
6/20/2017	P1	NEOPHYLAX	OLIGIUS	3										
6/21/2017	C2	MACCAFFERTIUM	MODESTUM	12	10	10	10	10	10	10	10	10	10	
6/21/2017	C2	PERLINELLA	DRYMO	3	10	10	10							

6/21/2017	C2	DIPLECTRONA	MODESTA	30	8	8	8	8	8	8	10	10	10	10
6/21/2017	C2	PSILOTRETA	SPP.	3	10	10	10							
6/21/2017	C2	NEOPHYLAX	OLIGIUS	18	10									
6/21/2017	D1	BAETIS	SPP.	1	10									
6/21/2017	D1	MACCAFFERTIUM	MODESTUM	1	10									
6/21/2017	D1	HYDROPSYCHE	BETTENI	18	10	10	10	10	10	10	10	10	10	10
6/21/2017	D1	NEOPHYLAX	OLIGIUS	1										
6/21/2017	D2	MACCAFFERTIUM	MODESTUM	6	10	10	10	10	10	10				
6/21/2017	D2	CHEUMATOPSYCHE	SPP.	7	10	10	10	10	10	10	10			
6/21/2017	D2	HYDROPSYCHE	BETTENI	5	10	10	10	10	10					
6/21/2017	D2	NEOPHYLAX	OLIGIUS	1										
10/18/2017	A1	BAETIS	SPP.	3	10	10								
10/18/2017	A1	MACCAFFERTIUM	MODESTUM	7	10	10								
10/18/2017	A1	CHEUMATOPSYCHE	SPP.	4	10	10	10	10						
10/18/2017	A2	MACCAFFERTIUM	MODESTUM	9	10	10	10	10	10	10	10	10	10	
10/18/2017	A3	NEOPHYLAX	OLIGIUS	6										
10/18/2017	A4	DIPLECTRONA	MODESTA	1	10									
10/18/2017	A4	NEOPHYLAX	OLIGIUS	11										
10/18/2017	R1	MACCAFFERTIUM	MODESTUM	4	10	10	10	10						
10/18/2017	R2	BAETIS	SPP.	9	10	10	10	10	10	10	10	10	10	
10/18/2017	R2	MACCAFFERTIUM	MODESTUM	14	10	10	10	10	10	10	10	10	10	10

10/18/2017	R2	CHEUMATOPSYCHE	SPP.	23	10	10	8	8	8	8	8	10	10	10
10/18/2017	R2	CHIMARRA	SPP.	3	10	10								
10/19/2017	C2	MACCAFFERTIUM	MODESTUM	2	10									
10/19/2017	C2	PERLINELLA	DRYMO	1	10									
10/19/2017	C2	DIPLECTRONA	MODESTA	2	10	10								
10/19/2017	C2	LEPIDOSTOMA	SPP.	2	10	10								
10/19/2017	D1	MACCAFFERTIUM	MODESTUM	2	10	10								
10/19/2017	D1	CHEUMATOPSYCHE	SPP.	10	10	10	10	10	10	10	10	10	8	8
10/19/2017	D2	CHIMARRA	SPP.	1	10									
10/19/2017	D2	NEOPHYLAX	OLIGIUS	3										
2/18/2018	A1	EPHEMERELLA	DOROTHEA	2	10	10								
2/18/2018	A1	MACCAFFERTIUM	MODESTUM	2	8	8								
2/18/2018	A1	CHEUMATOPSYCHE	SPP.	1	8									
2/18/2018	A1	LEPIDOSTOMA	SPP.	1	10									
2/18/2018	A3	EPHEMERELLA	DOROTHEA	23	10	10	10	10	10	10	10	10	10	10
2/18/2018	A3	MACCAFFERTIUM	MODESTUM	2	8	8								
2/18/2018	A3	LEPIDOSTOMA	SPP.	1	10									
2/18/2018	A3	PYCNOPSYCHE	SCABRIPENNIS	1	10									
2/18/2018	A3	CHIMARRA	SPP.	5	8	8	8	8	8					
2/18/2018	A3	NEOPHYLAX	OLIGIUS	2	8	8								
2/18/2018	A4	IRONOQUIA	PUNCTACISSIMA	1	10									

2/18/2018	A4	NEOPHYLAX	OLIGIUS	10											
2/18/2018	C2	DANNELLA	SIMPLEX	4	10	10	10	10							
2/18/2018	C2	MACCAFFERTIUM	MODESTUM	10	8	8	8	8	8	8	8	8	8	8	
2/18/2018	C2	ECCOPTURA	XANTHENES	2	8	8									
2/18/2018	C2	ANISOCENTROPUS	PYRALOIDES	1	8										
2/18/2018	C2	DIPLECTRONA	MODESTA	3	8	8	8								
2/18/2018	C2	LEPIDOSTOMA	SPP.	9	10	10	10	10	10	10	10	10			
2/18/2018	C2	PYCNOPSYCHE	SCABRIPENNIS	3	8	8	8								
2/18/2018	C2	RHYACOPHILA	SPP.	2	8	8									
2/18/2018	R1	MACCAFFERTIUM	MODESTUM	6	10	10	10	10	10	10					
2/18/2018	R2	EPHEMERELLA	DOROTHEA	1	10										
2/18/2018	R2	MACCAFFERTIUM	MODESTUM	7	10	10	10	10	10	10	10				
2/18/2018	R2	CHEUMATOPSYCHE	SPP.	2	8	8									
2/18/2018	R2	DIPLECTRONA	MODESTA	1	8										
2/18/2018	R2	LEPIDOSTOMA	SPP.	1	20										
2/18/2018	P1	BAETIS	SPP.	1	10										
2/18/2018	P1	MACCAFFERTIUM	MODESTUM	3	10	10	10								
2/18/2018	P1	DIPLECTRONA	MODESTA	2	8	8									
2/18/2018	P1	PYCNOPSYCHE	SCABRIPENNIS	4	10	10	10	8							
8/16/2018	C1	BAETIS	SPP.	1	10										
8/16/2018	C1	DIPLECTRONA	MODESTA	3	8	8	8								

8/16/2018	C2	DANNELLA	SIMPLEX	2	10	10								
8/16/2018	C2	MACCAFFERTIUM	MODESTUM	3	10	10	10							
8/16/2018	C2	CHEUMATOPSYCHE	SPP.	1	8									
8/16/2018	C2	LEPIDOSTOMA	SPP.	3	10	10	10							
8/16/2018	C2	PYCNOPSYCHE	SCABRIPENNIS	2	8									
8/16/2018	C2	CHIMARRA	SPP.	1	10									
8/16/2018	C2	NEOPHYLAX	OLIGIUS	13	10									
8/16/2018	D1	PLAUDITUS	CESTUS	8	10	10	10	10	10	10	10	10	10	10
8/16/2018	D1	PERLINELLA	DRYMO	1	10									
8/16/2018	D1	CHEUMATOPSYCHE	SPP.	8	10	10	10	10	10	10				
8/17/2018	A3	BAETIS	SPP.	10	10	10	10	10	10	10	10	10	10	10
8/17/2018	A4	BAETIS	SPP.	2	10									
8/17/2018	R1	BAETIS	SPP.	2	10									
8/17/2018	R1	CHEUMATOPSYCHE	SPP.	1	10									
8/17/2018	R2	BAETIS	INTERCALARIS	2	10	10								
8/17/2018	R2	MACCAFFERTIUM	MODESTUM	1	10									
8/17/2018	R2	CHEUMATOPSYCHE	SPP.	3	10	10	10							
11/8/2018	A1	BAETIS	INTERCALARIS	2	10	10								
11/8/2018	A1	CHEUMATOPSYCHE	SPP.	20	8	8	8	8	8	8	8	8	8	8
11/8/2018	A1	DIPLECTRONA	MODESTA	2	10	10								
11/8/2018	A1	CHIMARRA	SPP.	1	10									

11/8/2018	A2	BAETIS	SPP.	1	10										
11/8/2018	A2	DIPLECTRONA	MODESTA	6	10	10	10	10	10	10					
11/8/2018	A3	CHEUMATOPSYCHE	SPP.	1	10										
11/8/2018	A3	HYDROPSYCHE	BETTENI	1	10										
11/8/2018	A4	BAETIS	SPP.	6	10	10	10	10							
11/8/2018	A4	MACCAFFERTIUM	MODESTUM	1	10										
11/8/2018	A4	CHEUMATOPSYCHE	SPP.	4	10	10	10	10							
11/8/2018	A4	HYDROPSYCHE	BETTENI	2	10	10									
11/8/2018	C1	BAETIS	INTERCALARIS	18	10	10	10	10	10	10	10	10	10	10	
11/8/2018	C1	DANNELLA	SIMPLEX	1	10										
11/8/2018	C1	MACCAFFERTIUM	MODESTUM	25	8	8	8	8	8	8	8	8	8	8	
11/8/2018	C1	CHEUMATOPSYCHE	SPP.	33	10	10	10	10	10	10	10	8	8	8	
11/8/2018	C1	DIPLECTRONA	MODESTA	1	8										
11/8/2018	C1	CHIMARRA	SPP.	1	10										
11/8/2018	C2	BAETIS	INTERCALARIS	1	10										
11/8/2018	C2	BAETIS	SPP.	1	10										
11/8/2018	C2	DANNELLA	SIMPLEX	1	10										
11/8/2018	C2	MACCAFFERTIUM	MODESTUM	7	10	10									
11/8/2018	C2	ALLOPERLA	SPP.	10	10	10	10	10	10	10	10	10	10	10	
11/8/2018	C2	PERLINELLA	DRYMO	4	10	10	10	10							
11/8/2018	C2	DIPLECTRONA	MODESTA	12	10	10	10	10	10	10	10	10	10	10	

11/8/2018	C2	RHYACOPHILA	TORVA	2	10	10								
11/8/2018	D1	MACCAFFERTIUM	MODESTUM	2	10	10								
11/8/2018	D1	CHEUMATOPSYCHE	SPP.	162	8	8	8	8	8	8	8	8	8	8
11/8/2018	D2	HYDROPSYCHE	BETTENI	2	8	8								
11/8/2018	D2	CHEUMATOPSYCHE	SPP.	162	8	8	8	8	8	8	8	8	8	8
11/8/2018	P1	CHEUMATOPSYCHE	SPP.	6	10	10	20	20	20	20				
2/25/2019	C1	BAETIS	SPP.	4	10	10	10	10						
2/25/2019	C1	EPHEMERELLA	DOROTHEA	23	8	8	8	8	8	8	8	8	8	8
2/25/2019	C1	MACCAFFERTIUM	MODESTUM	7	10	10	8	8	8	8	8			
2/25/2019	C1	ALLOPERLA	SPP.	1	20									
2/25/2019	C1	PERLINELLA	DRYMO	1	8									
2/25/2019	C1	APHINEMURA	SPP.	1	20									
2/25/2019	C1	HYDROPSYCHE	BETTENI	9	8	8	8	8	8	8	8	8	8	
2/25/2019	C2	EPHEMERELLA	DOROTHEA	19	8	8	8	8	8	8	8	8	8	8
2/25/2019	C2	MACCAFFERTIUM	MODESTUM	6	8	8	8	8	8	8				
2/25/2019	C2	ALLOPERLA	SPP.	10	20	20	20	20	20	20	20	20	20	20
2/25/2019	C2	DIPLECTRONA	MODESTA	1	10									
2/25/2019	C2	HYDROPSYCHE	BETTENI	1	8	8	8	8	8	8	8			
2/25/2019	C2	PYCNOPSYCHE	SCABRIPENNIS	1	20									
2/25/2019	C2	NEOPHYLAX	OLIGIUS	10	8									
2/25/2019	D1	MACCAFFERTIUM	MODESTUM	1	8									

2/25/2019	D1	CHEUMATOPSYCHE	SPP.	42	8	8	8	8	8	8	8	8	8	8
2/25/2019	D2	CHEUMATOPSYCHE	SPP.	42	8	8	8	8	8	8	8	8	8	8
2/25/2019	D2	HYDROPSYCHE	BETTENI	4	8	8	8	8						
2/25/2019	P1	CHEUMATOPSYCHE	SPP.	3	8	8	8							
2/26/2019	A1	CHEUMATOPSYCHE	SPP.	2	8	8								
2/26/2019	A1	HYDROPSYCHE	BETTENI	2	8	8								
2/26/2019	A1	NEOPHYLAX	OLIGIUS	3										
2/26/2019	A2	BAETIS	INTERCALARIS	4	8	8	8	8						
2/26/2019	A2	CHEUMATOPSYCHE	SPP.	10	8	8	8	8	8	8	8	8	8	8
2/26/2019	A3	PLAUDITUS	CESTUS	1	8									
2/26/2019	A3	MACCAFFERTIUM	MODESTUM	1	8									
2/26/2019	A3	CHEUMATOPSYCHE	SPP.	4	8	8	8	8						
2/26/2019	A4	BAETIS	INTERCALARIS	11	10	10	10	10	10	10	10	10	10	10
2/26/2019	A4	MACCAFFERTIUM	MODESTUM	1	8									
2/26/2019	A4	CHEUMATOPSYCHE	SPP.	5	8	8	8	8	8					
2/26/2019	R1	BAETIS	INTERCALARIS	2	10	10								
2/26/2019	R1	EPHEMERELLA	DOROTHEA	1	8									
7/15/2019	C1	BAETIS	INTERCALARIS	2	10	10								
7/15/2019	C1	PLAUDITUS	CESTUS	3	20	20	20							
7/15/2019	C1	EPHEMERELLA	DOROTHEA	2	10	10								
7/15/2019	C1	MACCAFFERTIUM	MODESTUM	6	10	10	10	10	10	10				

7/15/2019	C1	ECCOPTURA	XANTHENES	9	10	10	10	10	10	10	10	10	10	
7/15/2019	C1	CHEUMATOPSYCHE	SPP.	18	10	10	10	10	10	10	10	10	10	10
7/15/2019	C1	HYDROPSYCHE	BETTENI	68	10	10	10	10	10	8	8	8	8	8
7/15/2019	C2	MACCAFFERTIUM	MODESTUM	7	16	16	10	10	10	10				
7/15/2019	C2	PERLINELLA	DRYMO	7	10	10	10	10	10	10	10			
7/15/2019	C2	CHEUMATOPSYCHE	SPP.	4										
7/15/2019	C2	DIPLECTRONA	MODESTA	1	8									
7/15/2019	C2	HYDROPSYCHE	BETTENI	2	8	16								
7/15/2019	C2	LEPIDOSTOMA	SPP.	1										
7/15/2019	D1	CHEUMATOPSYCHE	SPP.	29										
7/15/2019	D1	HYDROPSYCHE	BETTENI	10	10	10	10	10	10	20	20	20	20	20
7/15/2019	D2	CHEUMATOPSYCHE	SPP.	25	10	8	8	8	8	10	10	10	10	10
7/15/2019	D2	HYDROPSYCHE	BETTENI	5	8	8	8							
7/15/2019	P1	AMELETUS	LINEATUS	1										
7/15/2019	P1	CHEUMATOPSYCHE	SPP.	151	10	10	10	10	10	10	10	10	10	10
7/15/2019	P1	HYDROPSYCHE	BETTENI	67	8	8	8	8	8	8	8	10	10	10
7/17/2019	A1			1	20									
7/17/2019	A1	BAETIS	INTERCALARIS	5	20	20	20	20	20					
7/17/2019	A1	EPHEMERELLA	DOROTHEA	1										
7/17/2019	A1	MACCAFFERTIUM	MODESTUM	2	10	10								
7/17/2019	A1	CHEUMATOPSYCHE	SPP.	86	8	8	8	8	8	8	8	8	8	8

7/17/2019	A1	HYDROPSYCHE	BETTENI	30	10	10	10	10	8	8	8	8	8	10
7/17/2019	A2	MACCAFFERTIUM	MODESTUM	1	20									
7/17/2019	A2	CHEUMATOPSYCHE	SPP.	36	10	10	10	10	10	10	10	10	10	10
7/17/2019	A2	HYDROPSYCHE	BETTENI	11	8	8	8	8	20	20	20	10	10	20
7/17/2019	A3	BAETIS	INTERCALARIS	22	20	20	20	20	20	20	20	20	20	20
7/17/2019	A3	CHEUMATOPSYCHE	SPP.	63	10	10	10	10	10	8	8	8	8	8
7/17/2019	A3	HYDROPSYCHE	BETTENI	106	8	8	8	8	8	8	8	10	10	10
7/17/2019	A4	BAETIS	INTERCALARIS	1	10									
7/17/2019	A4	MACCAFFERTIUM	MODESTUM	7	8	8	8	8	8	8	8			
7/17/2019	A4	CHEUMATOPSYCHE	SPP.	23	10	10	10	10	10	10	10	10	10	10
7/17/2019	A4	HYDROPSYCHE	BETTENI	7	8	8	8	8	8	10	10			
7/17/2019	R1	BAETIS	INTERCALARIS	4	10	10	10	10						
7/17/2019	R1	DANNELLA	SIMPLEX	3	20	20	20							
7/17/2019	R1	MACCAFFERTIUM	MODESTUM	19	10	10	10	10	10	10	10	10	10	10
7/17/2019	R1	CHEUMATOPSYCHE	SPP.	19	8	10	10	10	10	10	10	10	10	10
7/17/2019	R2	MACCAFFERTIUM	MODESTUM	14	10	10	10	10	10	10	10	10	10	10
7/17/2019	R2	CHEUMATOPSYCHE	SPP.	48	10	10	10	10	10	16	16	20	20	10
7/17/2019	R2	HYDROPSYCHE	BETTENI	48	10	10	10	8	8	8	10	10	10	10
7/17/2019	R2	CHIMARRA	SPP.	1										
11/20/2019	C1	MACCAFFERTIUM	MODESTUM	2	10	10								
11/20/2019	C1	CHEUMATOPSYCHE	SPP.	7	8	8	8	8	8	8	8			

11/20/2019	C1	HYDROPSYCHE	BETTENI	7	8	8	8	10	10	10	10			
11/20/2019	C2	ALLOPERLA	SPP.	3	20	20	20							
11/20/2019	C2	CHEUMATOPSYCHE	SPP.	1	10									
11/20/2019	D1	BAETIS	SPP.	1	16									
11/20/2019	D1	MACCAFFERTIUM	MODESTUM	3	10	10	10							
11/20/2019	D1	ALLOPERLA	SPP.	3	20	20	20							
11/20/2019	D1	CHEUMATOPSYCHE	SPP.	1	10									
11/20/2019	D2	BAETIS	SPP.	5	16	16	16	16	16					
11/20/2019	D2	CHEUMATOPSYCHE	SPP.	5	10	10	10	10	10					
11/20/2019	D2	HYDROPSYCHE	BETTENI	1	8									
11/20/2019	D2	CHIMARRA	SPP.	1	10									
11/22/2019	A1	BAETIS	SPP.	1	20									
11/22/2019	A1	DANNELLA	SIMPLEX	9	16	16	16	16	16	16	16	16	16	
11/22/2019	A1	MACCAFFERTIUM	MODESTUM	1	10									
11/22/2019	A1	PERLINELLA	DRYMO	1	10									
11/22/2019	A2	BAETIS	INTERCALARIS	6	10	10	10	10	10	40				
11/22/2019	A2	EPHEMERELLA	DOROTHEA	2	20	20								
11/22/2019	A2	MACCAFFERTIUM	MODESTUM	2	20	20								
11/22/2019	A2	CHEUMATOPSYCHE	SPP.	3	10	20	20							
11/22/2019	R1	EPHEMERELLA	DOROTHEA	5	16	16	16	16	16					
11/22/2019	R1	MACCAFFERTIUM	MODESTUM	101	10	10	10	10	10	10	10	10	10	10

11/22/2019	R1	HYDROPSYCHE	BETTENI	2	8	8								
11/22/2019	R1	CHIMARRA	SPP.	11	10	10	10	10	10	10	10	10	10	10
11/22/2019	R2	BAETIS	INTERCALARIS	3	10	10	10							
11/22/2019	R2	EPHEMERELLA	DOROTHEA	1	20									
11/22/2019	R2	MACCAFFERTIUM	MODESTUM	17	16	16	16	16	16	10	10	10	10	10
11/22/2019	R2	CHEUMATOPSYCHE	SPP.	5	10	8	10	10	10					
11/22/2019	R2	HYDROPSYCHE	BETTENI	3	10	10	8							
11/22/2019	R2	CHIMARRA	SPP.	1	20									
2/14/2020	A1	MACCAFFERTIUM	MODESTUM	32	10	10	8	8	8	8	10	10	10	10
2/14/2020	A1	CHEUMATOPSYCHE	SPP.	5	16	8	8	8	8					
2/14/2020	A1	HYDROPSYCHE	BETTENI	1	8									
2/14/2020	A1	CHIMARRA	SPP.	2	8	8								
2/14/2020	A2	BAETIS	SPP.	5	12.5	12.5	16	16	12.5					
2/14/2020	A2	MACCAFFERTIUM	MODESTUM	10	8	8	8	8	8	8	8	8	10	10
2/14/2020	A2	CHEUMATOPSYCHE	SPP.	3	8	8	8							
2/14/2020	A2	HYDROPSYCHE	BETTENI	4	8	8	8	8						
2/14/2020	A3	DANNELLA	SIMPLEX	1	16									
2/14/2020	A4	MACCAFFERTIUM	MODESTUM	1	12.5									
2/14/2020	C1	BAETIS	SPP.	1	8									
2/14/2020	C1	DANNELLA	SIMPLEX	3	8	8	8							
2/14/2020	C1	MACCAFFERTIUM	MODESTUM	4	8	8	8	8						

2/14/2020	C1	ECCOPTURA	XANTHENES	3	8	8	8							
2/14/2020	C1	CHEUMATOPSYCHE	SPP.	2	8	8								
2/14/2020	C1	DIPLECTRONA	MODESTA	1	8									
2/14/2020	C1	HYDROPSYCHE	BETTENI	3	8	8	8							
2/14/2020	C1	LEPIDOSTOMA	SPP.	14	16	16	16	16	16	16	16	16	16	16
2/14/2020	C2	EPHEMERELLA	DOROTHEA	16	10	10	10	10	10	10	10	10	10	10
2/14/2020	C2	MACCAFFERTIUM	MODESTUM	23	8	8	8	8	8	8	8	8	8	8
2/14/2020	C2	CHEUMATOPSYCHE	SPP.	8	8	8	8	8	8	12	12	12		
2/14/2020	C2	HYDROPSYCHE	BETTENI	1	8									
2/14/2020	C2	LEPIDOSTOMA	SPP.	4	8	8	8	8						
2/14/2020	D1	DANNELLA	SIMPLEX	1	8									
2/14/2020	D1	MACCAFFERTIUM	MODESTUM	1	8									
2/14/2020	D1	CHEUMATOPSYCHE	SPP.	1	10									
2/14/2020	D2	CHEUMATOPSYCHE	SPP.	6	8	8	10	8	8	8				
2/14/2020	R1	BAETIS	SPP.	11	16	16	12.5	16	16	16	16	16	16	16
2/14/2020	R1	DANNELLA	SIMPLEX	2	16	16								
2/14/2020	R1	MACCAFFERTIUM	MODESTUM	146	8	8	8	8	8	8	8	8	8	8
2/14/2020	R1	CHEUMATOPSYCHE	SPP.	9	8	8	8	8	8	8	16	10	16	
2/14/2020	R1	HYDROPSYCHE	BETTENI	3	8	10	16							
2/14/2020	R1	CHIMARRA	SPP.	20	8	8	8	8	8	8	8	8	12.5	12.5
2/14/2020	R2	MACCAFFERTIUM	MODESTUM	61	10	8	10	8	8	10	10	10	10	10

2/14/2020	R2	CHEUMATOPSYCHE	SPP.	19	8	8	8	8	8	8	8	8	8	8
2/14/2020	R2	HYDROPSYCHE	BETTENI	7	8	8	8	12.5	8	16	16			
2/14/2020	R2	CHIMARRA	SPP.	21	12.5	10	10	10	10	10	10	10	10	20
2/14/2020	P1	CHEUMATOPSYCHE	SPP.	2	8	16								
7/28/2020	A1	DANNELLA	SIMPLEX	35	20	20	16	20	20	20	20	20	20	20
7/28/2020	A1	MACCAFFERTIUM	MODESTUM	27	16	16								
7/28/2020	A2	MACCAFFERTIUM	MODESTUM	1	12.5									
7/28/2020	A2	CHEUMATOPSYCHE	SPP.	1	8									
7/28/2020	A2	HYDROPSYCHE	BETTENI	1	8									
7/28/2020	A3			1	12.5									
7/28/2020	A3	CHEUMATOPSYCHE	SPP.	6	10	10	10	10	10	10				
7/28/2020	A3	HYDROPSYCHE	BETTENI	3	16	16								
7/28/2020	A4	EPHEMERELLA	DOROTHEA	1	16									
7/28/2020	C1	MACCAFFERTIUM	MODESTUM	3	8	8	8							
7/28/2020	C1	ECCOPTURA	XANTHENES	17	10	10	10	10	10	10	10	10	10	10
7/28/2020	C1	CHEUMATOPSYCHE	SPP.	2	8	8								
7/28/2020	C1	LEPIDOSTOMA	SPP.	3	8	8	8							
7/28/2020	C2	MACCAFFERTIUM	MODESTUM	7	10	10	10	10	10	10				
7/28/2020	C2	ALLOPERLA	SPP.	3	12.5	12.5	12.5							
7/28/2020	C2	ECCOPTURA	XANTHENES	11	10	10	10	10	10	10	10	10	10	10
7/28/2020	C2	PERLINELLA	EPHYRE	4	16	16	16	16						

7/28/2020	C2	CHEUMATOPSYCHE	SPP.	6	10	10	10	8	8	8				
7/28/2020	C2	HYDROPSYCHE	BETTENI	5	8	10	12.5	16	16					
7/28/2020	C2	PYCNOPSYCHE	SCABRIPENNIS	11	8	8	10	10	10	10	10	10	10	8
7/28/2020	D1	BAETIS	SPP.	1	16									
7/28/2020	D1	DANNELLA	SIMPLEX	2	12.5	12.5								
7/28/2020	D1	MACCAFFERTIUM	MODESTUM	5	10	10	20	20	20					
7/28/2020	D1	CHEUMATOPSYCHE	SPP.	2	16	16								
7/28/2020	D2	BAETIS	SPP.	2	12.5	12.5								
7/28/2020	D2	MACCAFFERTIUM	MODESTUM	1	12.5									
7/28/2020	D2	CHEUMATOPSYCHE	SPP.	3	8	8	20							
7/28/2020	D2	HYDROPSYCHE	BETTENI	7	8	8	8	8	8	12.5	16			
7/28/2020	R1	DANNELLA	SIMPLEX	4	16	16	16	16						
7/28/2020	R1	MACCAFFERTIUM	MODESTUM	31	8	10	10	10	10	10	10	10	10	10
7/28/2020	R1	CHIMARRA	SPP.	1	8									
7/28/2020	R1	HYDROPSYCHE	BETTENI	1	8									
7/28/2020	R1	CHEUMATOPSYCHE	SPP.	4	10	12.5	12.5	12.5						
7/28/2020	R2	MACCAFFERTIUM	MODESTUM	27	10	10	10	10	10	10	10	10	10	10
7/28/2020	R2	CHEUMATOPSYCHE	SPP.	2	8	16								
7/28/2020	P1	MACCAFFERTIUM	MODESTUM	3	12.5	12.5								
7/28/2020	P1	CHEUMATOPSYCHE	SPP.	5	10	20	20							
7/28/2020	P1	HYDROPSYCHE	BETTENI	3	12.5	12.5	16							

Appendix B3. Raw length measurements in ocular units (ou) for the EPT taxa across all sites from 2016-2020. The symbol '#' represents the species count for the respective date and site. The symbol 'L' represents the species length in ocular units. **Note highlighted cells represent species that were not able to be measured due to damage.*

DATE	SITE	GENUS	SPECIES	#	L 1	L 2	L 3	L 4	L 5	L 6	L 7	L 8	L 9	L 10
7/28/2016	A1	MACCAFFERTIUM	MODESTUM	3	44	51								
7/28/2016	A1	STENONEMA	FEMORATUM	2	41									
7/28/2016	A1	LEPIDOSTOMA	SPP.	2	81									
7/28/2016	A1	IRONOQUIA	PUNCTACISSIMA	1	61									
7/28/2016	A2	HABROPHLEBIA	SPP.	3	29	22								
7/28/2016	A2	PERLINELLA	DRYMO	2	76	50								
7/28/2016	A2	GOERA	CALCARATA	1	62									
7/28/2016	A2	CHEUMATOPSYCHE	SPP.	8	94	92	58	77	37	42	32	52		
7/28/2016	A2	LEPIDOSTOMA	SPP.	15	99	75	96	88	100					
7/28/2016	A2	OLIGOSTOMIS	SPP.	2										
7/28/2016	A3	STENONEMA	FEMORATUM	1	73									
7/28/2016	A3	HABROPHLEBIA	SPP.	1	33									
7/28/2016	A3	ALLOPERLA	SPP.	1										

7/28/2016	A3	PERLINELLA	DRYMO	4	58	56	73							
7/28/2016	A3	HYDROPSYCHE	BETTENI	1	62									
7/28/2016	A3	LEPIDOSTOMA	SPP.	3										
7/28/2016	A3	OLIGOSTOMIS	SPP.	2	81									
7/28/2016	A4	LEPIDOSTOMA	SPP.	1										
7/28/2016	R1	BAETIS	INTERCALARIS	3	42	41								
7/28/2016	R1	MACCAFFERTIUM	MODESTUM	3	54	74								
7/28/2016	R1	STENONEMA	FEMORATUM	2	51	64								
7/28/2016	R1	PTILOSTOMIS	SPP.	2	84	85								
7/28/2016	R2	BAETIS	INTERCALARIS	2	38									
7/28/2016	R2	MACCAFFERTIUM	MODESTUM	2	60	31								
7/28/2016	R2	CHEUMATOPSYCHE	SPP.	4	105	75	72	55						
7/28/2016	R2	DIPLECTRONA	MODESTA	3	75	78	58							
7/28/2016	P1	CHIMARRA	SPP.	1										
7/28/2016	C1	BAETIS	INTERCALARIS	1										
7/28/2016	C1	PERLINELLA	DRYMO	2	66	39								

7/28/2016	C1	DIPLECTRONA	MODESTA	1	77											
7/28/2016	C1	HYDROPSYCHE	BETTENI	5												
7/28/2016	C1	LEPIDOSTOMA	SPP.	1												
7/28/2016	C2	MACCAFFERTIUM	MODESTUM	1	83											
7/28/2016	C2	PERLINELLA	DRYMO	2	52	44										
7/28/2016	C2	HYDROPSYCHE	BETTENI	2	96	81										
7/28/2016	C2	LEPIDOSTOMA	SPP.	1												
7/28/2016	C2	NEOPHYLAX	OLIGIUS	9												
11/14/2016	A1	MACCAFFERTIUM	MODESTUM	1	56											
11/14/2016	A1	ALLOCAPNIA	SPP.	36	54	52	50	52	50	51	53	39	34	42		
11/14/2016	A2	EURYLOPHELLA	DORIS	1	44											
11/14/2016	A2	MACCAFFERTIUM	MODESTUM	4	45	50	40	71								
11/14/2016	A2	ALLOCAPNIA	SPP.	53	47	63	68	52	51	49	36	41	55	62		
11/14/2016	A2	ECCOPTURA	XANTHENES	1	74											
11/14/	A2	PERLINELLA	DRYMO	1	69											

2016														
11/14/2016	A2	CHEUMATOPSYCHE	SPP.	1	55									
11/14/2016	A2	HYDROPSYCHE	BETTENI	2	96	71								
11/14/2016	A3	ALLOCAPNIA	SPP.	6	49	51	40	44	25					
11/14/2016	A4	ALLOCAPNIA	SPP.	3	29	25								
11/14/2016	R1	MACCAFFERTIUM	MODESTUM	3	72	76	57							
11/14/2016	R1	ALLOCAPNIA	SPP.	7	48									
11/14/2016	R1	HYDROPSYCHE	BETTENI	3	99	52	70							
11/14/2016	R2	PERLINELLA	DRYMO	1	51									
11/14/2016	R2	PERLINELLA	EPHYRE	1	73									
11/14/2016	R2	HYDROPSYCHE	BETTENI	3	58	43	50							
11/16/2016	C2	EURYLOPHELLA	DORIS	1	42									
11/16/2016	C2	MACCAFFERTIUM	MODESTUM	1	93									

11/16/2016	C2	ALLOCAPNIA	SPP.	6	24	62	26	32	30					
11/16/2016	C2	PERLINELLA	DRYMO	2	82	63								
11/16/2016	C2	PERLINELLA	EPHYRE	1	97									
11/16/2016	C2	DIPLECTRONA	MODESTA	2										
11/16/2016	C2	HYDROPSYCHE	BETTENI	6	93	35	59	95	38	36				
11/16/2016	C2	PYCNOPSYCHE	SCABRIPENNIS	1										
3/17/2017	A1	BAETIS	INTERCALARIS	9	95	57	54	55	62	52	51			
3/17/2017	A1	BAETIS	SPP.	294	39	46	52	50	40	38	44	38	42	38
3/17/2017	A1	EPHEMERELLA	DOROTHEA	74	78	86	86	76	82	84	88	85	77	80
3/17/2017	A1	MACCAFFERTIUM	MODESTUM	2	72	87	46							
3/17/2017	A1	ALLOPERLA	SPP.	28	52	37	58	63	52	52	50	49	42	48
3/17/2017	A1	APHINEMURA	SPP.	21	61	54	45	51	61	65	39	50	58	64
3/17/2017	A1	ISOPERLA	TRANSMARINA	30	93	95	96	43	35	36	42	45	48	38
3/17/2017	A1	IRONOQUIA	PUNCTACISSIMA	2	145	167								

3/17/2017	A1	NEOPHYLAX	OLIGIUS	1										
3/17/2017	A2	BAETIS	INTERCALARIS	4	35	48								
3/17/2017	A2	EPHEMERELLA	DOROTHEA	1	90									
3/17/2017	A2	MACCAFFERTIUM	MODESTUM	1	37									
3/17/2017	A2	ALLOPERLA	SPP.	8	49	41	43	45	46	48				
3/17/2017	A2	APHINEMURA	SPP.	1	43									
3/17/2017	A2	LEPIDOSTOMA	SPP.	3	68	105	163							
3/17/2017	A2	NEOPHYLAX	OLIGIUS	20	88	72								
3/17/2017	A3	BAETIS	INTERCALARIS	4	57	80	86	107						
3/17/2017	A3	EPHEMERELLA	DOROTHEA	4	85	68	47	76						
3/17/2017	A3	MACCAFFERTIUM	MODESTUM	1	37									
3/17/2017	A3	ALLOPERLA	SPP.	8	42	49	34	49	38	33	31	40		
3/17/2017	A3	APHINEMURA	SPP.	3	50	45	40							
3/17/2017	A3	DIPLOPERLA	DUPLICATA	1	19									
3/17/2017	A3	LEPIDOSTOMA	SPP.	1	110									
3/17/2017	A3	NEOPHYLAX	OLIGIUS	15	90									

3/17/2017	A4	BAETIS	INTERCALARIS	3	39	37	46							
3/17/2017	A4	EPHEMERELLA	DOROTHEA	1	78									
3/17/2017	A4	ALLOPERLA	SPP.	1	36									
3/17/2017	A4	APHINEMURA	SPP.	15	52	51	54	63	55	57	52	53	50	33
3/17/2017	A4	ISOPERLA	TRANSMARINA	5	28	35	39	43	31					
3/17/2017	A4	CHEUMATOPSYCHE	SPP.	1	84									
3/17/2017	A4	HYDROPSYCHE	BETTENI	1	110									
3/17/2017	A4	NEOPHYLAX	OLIGIUS	20	72	58	69	62	84					
3/17/2017	C1	EPHEMERELLA	DOROTHEA	1	25									
3/17/2017	C1	MACCAFFERTIUM	MODESTUM	2	105	76								
3/17/2017	C1	PERLINELLA	DRYMO	2	27	26								
3/17/2017	C1	ANISOCENTROPUS	PYRALOIDES	1	221									
3/17/2017	C1	NEOPHYLAX	OLIGIUS	29	62	69	52							
3/17/2017	C2	BAETIS	INTERCALARIS	1										
3/17/2017	C2	DANNELLA	SIMPLEX	2	80	88								
3/17/2017	C2	EPHEMERELLA	DOROTHEA	2	59	32								

3/17/2017	C2	MACCAFFERTIUM	MODESTUM	2	85	79								
3/17/2017	C2	ALLOPERLA	SPP.	1	63									
3/17/2017	C2	PERLINELLA	DRYMO	2	23									
3/17/2017	C2	APHINEMURA	SPP.	1	49									
3/17/2017	C2	CHEUMATOPSYCHE	SPP.	2	55	105								
3/17/2017	C2	LEPIDOSTOMA	SPP.	1	32									
3/17/2017	C2	NEOPHYLAX	OLIGIUS	37	75	77								
3/17/2017	D2	MACCAFFERTIUM	MODESTUM	2	66	84								
3/17/2017	D2	LEPIDOSTOMA	SPP.	1	59									
3/17/2017	D2	NEOPHYLAX	OLIGIUS	10										
3/17/2017	R1	BAETIS	INTERCALARIS	16	104	41	42	43	31	35	28	38	27	26
3/17/2017	R1	EPHEMERELLA	DOROTHEA	2	72	70								
3/17/2017	R1	MACCAFFERTIUM	MODESTUM	1	100									
3/17/2017	R1	PERLINELLA	DRYMO	1	91									
3/17/2017	R1	APHINEMURA	SPP.	1	57									
3/17/2017	R1	NEOPHYLAX	OLIGIUS	3	65									

3/17/2017	R2	BAETIS	INTERCALARIS	2	52	36									
3/17/2017	R2	EPHEMERELLA	DOROTHEA	5	91	88	76	84	85						
3/17/2017	R2	MACCAFFERTIUM	MODESTUM	4	90	99	93	58							
3/17/2017	R2	CHEUMATOPSYCHE	SPP.	1	92										
3/17/2017	P1	MACCAFFERTIUM	MODESTUM	1	87										
6/20/2017	A1	IRONOQUIA	PUNCTACISSIMA	1	73										
6/20/2017	A3	MACCAFFERTIUM	MODESTUM	1	80										
6/20/2017	A3	PERLINELLA	DRYMO	1	69										
6/20/2017	A3	CHEUMATOPSYCHE	SPP.	1	90										
6/20/2017	A3	HYDROPSYCHE	BETTENI	1	82										
6/20/2017	A3	NEOPHYLAX	OLIGIUS	21											
6/20/2017	A4	HYDROPSYCHE	BETTENI	1	94										
6/20/2017	A4	NEOPHYLAX	OLIGIUS	26											
6/20/2017	R1	MACCAFFERTIUM	MODESTUM	1	52										
6/20/2017	R1	CHEUMATOPSYCHE	SPP.	2	30	80									
6/20/2017	R1	HYDROPSYCHE	BETTENI	1	95										

6/20/2017	R2	HYDROPSYCHE	BETTENI	3	92	18	27							
6/20/2017	P1	MACCAFFERTIUM	MODESTUM	5	78	57	48	55	42					
6/20/2017	P1	CHEUMATOPSYCHE	SPP.	18	98	83	95	59	40	62	63	49	43	65
6/20/2017	P1	HYDROPSYCHE	BETTENI	1	100									
6/20/2017	P1	OLIGOSTOMIS	SPP.	1										
6/20/2017	P1	NEOPHYLAX	OLIGIUS	3										
6/21/2017	C2	MACCAFFERTIUM	MODESTUM	12	77	93	89	62	50	52	35	31	33	
6/21/2017	C2	PERLINELLA	DRYMO	3	41	35	30							
6/21/2017	C2	DIPLECTRONA	MODESTA	30	112	96	100	93	83	75	44	82	55	49
6/21/2017	C2	PSILOTRETA	SPP.	3	36	25	29							
6/21/2017	C2	NEOPHYLAX	OLIGIUS	18	36									
6/21/2017	D1	BAETIS	SPP.	1	29									
6/21/2017	D1	MACCAFFERTIUM	MODESTUM	1	31									
6/21/2017	D1	HYDROPSYCHE	BETTENI	18	73	64	92	70	72	50	40	47	46	31
6/21/2017	D1	NEOPHYLAX	OLIGIUS	1										
6/21/2017	D2	MACCAFFERTIUM	MODESTUM	6	68	71	68	49	56	38				

6/21/2017	D2	CHEUMATOPSYCHE	SPP.	7	82	82	90	79	52	60	62			
6/21/2017	D2	HYDROPSYCHE	BETTENI	5	33	87	71	94	97					
6/21/2017	D2	NEOPHYLAX	OLIGIUS	1										
10/18/2017	A1	BAETIS	SPP.	3	34	42								
10/18/2017	A1	MACCAFFERTIUM	MODESTUM	7	64	41								
10/18/2017	A1	CHEUMATOPSYCHE	SPP.	4	75	65	83	75						
10/18/2017	A2	MACCAFFERTIUM	MODESTUM	9	52	46	46	47	52	37	43	29	22	
10/18/2017	A3	NEOPHYLAX	OLIGIUS	6										
10/18/2017	A4	DIPLECTRONA	MODESTA	1	97									
10/18/2017	A4	NEOPHYLAX	OLIGIUS	11										
10/18/2017	R1	MACCAFFERTIUM	MODESTUM	4	36	73	44	37						
10/18/2017	R2	BAETIS	SPP.	9	52	47	36	57	45	40	39	46	52	
10/18/2017	R2	MACCAFFERTIUM	MODESTUM	14	61	69	48	44	39	50	37	46	43	52

10/18/2017	R2	CHEUMATOPSYCHE	SPP.	23	75	73	110	97	77	79	105	70	60	47
10/18/2017	R2	CHIMARRA	SPP.	3	60	40								
10/19/2017	C2	MACCAFFERTIUM	MODESTUM	2	96									
10/19/2017	C2	PERLINELLA	DRYMO	1	70									
10/19/2017	C2	DIPLECTRONA	MODESTA	2	84	62								
10/19/2017	C2	LEPIDOSTOMA	SPP.	2	52	37								
10/19/2017	D1	MACCAFFERTIUM	MODESTUM	2	59	52								
10/19/2017	D1	CHEUMATOPSYCHE	SPP.	10	52	58	55	98	71	82	44	35	95	95
10/19/2017	D2	CHIMARRA	SPP.	1	65									
10/19/2017	D2	NEOPHYLAX	OLIGIUS	3										
2/18/2018	A1	EPHEMERELLA	DOROTHEA	2	98	77								
2/18/2018	A1	MACCAFFERTIUM	MODESTUM	2	81	77								
2/18/2018	A1	CHEUMATOPSYCHE	SPP.	1	86									

2/18/2018	A1	LEPIDOSTOMA	SPP.	1	29									
2/18/2018	A3	EPHEMERELLA	DOROTHEA	23	98	66	80	53	60	79	39	69	47	35
2/18/2018	A3	MACCAFFERTIUM	MODESTUM	2	37	91								
2/18/2018	A3	LEPIDOSTOMA	SPP.	1	28									
2/18/2018	A3	PYCNOPSYCHE	SCABRIPENNIS	1	47									
2/18/2018	A3	CHIMARRA	SPP.	5	85	80	55	49	62					
2/18/2018	A3	NEOPHYLAX	OLIGIUS	2	47	48								
2/18/2018	A4	IRONOQUIA	PUNCTACISSIMA	1	40									
2/18/2018	A4	NEOPHYLAX	OLIGIUS	10										
2/18/2018	C2	DANNELLA	SIMPLEX	4	65	71	80	71						
2/18/2018	C2	MACCAFFERTIUM	MODESTUM	10	93	86	132	92	89	73	68	31	42	34
2/18/2018	C2	ECCOPTURA	XANTHENES	2	105	159								
2/18/2018	C2	ANISOCENTROPUS	PYRALOIDES	1	117									
2/18/2018	C2	DIPLECTRONA	MODESTA	3	119	92	28							
2/18/2018	C2	LEPIDOSTOMA	SPP.	9	33	32	44	28	24	32	22	22		
2/18/2018	C2	PYCNOPSYCHE	SCABRIPENNIS	3	61	75	88							

2/18/2018	C2	RHYACOPHILA	SPP.	2	103	112								
2/18/2018	R1	MACCAFFERTIUM	MODESTUM	6	53	87	47	46	32	36				
2/18/2018	R2	EPHEMERELLA	DOROTHEA	1	43									
2/18/2018	R2	MACCAFFERTIUM	MODESTUM	7	57	59	39	95	72	45	53			
2/18/2018	R2	CHEUMATOPSYCHE	SPP.	2	113	107								
2/18/2018	R2	DIPLECTRONA	MODESTA	1	92									
2/18/2018	R2	LEPIDOSTOMA	SPP.	1	52									
2/18/2018	P1	BAETIS	SPP.	1	46									
2/18/2018	P1	MACCAFFERTIUM	MODESTUM	3	68	55	52							
2/18/2018	P1	DIPLECTRONA	MODESTA	2	109	96								
2/18/2018	P1	PYCNOPSYCHE	SCABRIPENNIS	4	82	38	47	235						
8/16/2018	C1	BAETIS	SPP.	1	42									
8/16/2018	C1	DIPLECTRONA	MODESTA	3	108	78	88							
8/16/2018	C2	DANNELLA	SIMPLEX	2	32	30								
8/16/2018	C2	MACCAFFERTIUM	MODESTUM	3	53	60	34							
8/16/2018	C2	CHEUMATOPSYCHE	SPP.	1	86									

8/16/2018	C2	LEPIDOSTOMA	SPP.	3	42	72	33							
8/16/2018	C2	PYCNOPSYCHE	SCABRIPENNIS	2	126									
8/16/2018	C2	CHIMARRA	SPP.	1	70									
8/16/2018	C2	NEOPHYLAX	OLIGIUS	13	70									
8/16/2018	D1	PLAUDITUS	CESTUS	8	71	40	38	39	42	60	51	67	57	42
8/16/2018	D1	PERLINELLA	DRYMO	1	56									
8/16/2018	D1	CHEUMATOPSYCHE	SPP.	8	92	62	75	84	88	92	58	48		
8/17/2018	A3	BAETIS	SPP.	10	71	60	55	67	53	46	55	58	45	44
8/17/2018	A4	BAETIS	SPP.	2	52									
8/17/2018	R1	BAETIS	SPP.	2	36									
8/17/2018	R1	CHEUMATOPSYCHE	SPP.	1	74									
8/17/2018	R2	BAETIS	INTERCALARIS	2	68	66								
8/17/2018	R2	MACCAFFERTIUM	MODESTUM	1	42									
8/17/2018	R2	CHEUMATOPSYCHE	SPP.	3	52	64	81							
11/8/2018	A1	BAETIS	INTERCALARIS	2	68	47								
11/8/2018	A1	CHEUMATOPSYCHE	SPP.	20	94	66	60	95	85	52	93	75	70	55

11/8/2018	A1	DIPLECTRONA	MODESTA	2	74	98								
11/8/2018	A1	CHIMARRA	SPP.	1	82									
11/8/2018	A2	BAETIS	SPP.	1	54									
11/8/2018	A2	DIPLECTRONA	MODESTA	6	88	96	62	44	33	25				
11/8/2018	A3	CHEUMATOPSYCHE	SPP.	1	67									
11/8/2018	A3	HYDROPSYCHE	BETTENI	1	44									
11/8/2018	A4	BAETIS	SPP.	6	49	37	57	41						
11/8/2018	A4	MACCAFFERTIUM	MODESTUM	1	49									
11/8/2018	A4	CHEUMATOPSYCHE	SPP.	4	81	82	43	52						
11/8/2018	A4	HYDROPSYCHE	BETTENI	2	44	42								
11/8/2018	C1	BAETIS	INTERCALARIS	18	54	69	49	53	62	52	54	62	48	67
11/8/2018	C1	DANNELLA	SIMPLEX	1	44									
11/8/2018	C1	MACCAFFERTIUM	MODESTUM	25	119	71	32	38	49	62	52	60	46	78
11/8/2018	C1	CHEUMATOPSYCHE	SPP.	33	75	77	73	92	94	92	54	89	90	88
11/8/2018	C1	DIPLECTRONA	MODESTA	1	122									
11/8/2018	C1	CHIMARRA	SPP.	1	76									

11/8/2018	C2	BAETIS	INTERCALARIS	1	65									
11/8/2018	C2	BAETIS	SPP.	1	31									
11/8/2018	C2	DANNELLA	SIMPLEX	1	38									
11/8/2018	C2	MACCAFFERTIUM	MODESTUM	7	74	80								
11/8/2018	C2	ALLOPERLA	SPP.	10	45	25	24	23	26	19	22	22		
11/8/2018	C2	PERLINELLA	DRYMO	4	83	62	56	53						
11/8/2018	C2	DIPLECTRONA	MODESTA	12	95	81	72	86	72	68	52	46	47	34
11/8/2018	C2	RHYACOPHILA	TORVA	2	94	57								
11/8/2018	D1	MACCAFFERTIUM	MODESTUM	2	72	47								
11/8/2018	D1	CHEUMATOPSYCHE	SPP.	162	80	75	85	53	62	64	77	30	26	25
11/8/2018	D2	HYDROPSYCHE	BETTENI	2	115	37								
11/8/2018	D2	CHEUMATOPSYCHE	SPP.	162	89	87	74	80	77	72	48	50	55	32
11/8/2018	P1	CHEUMATOPSYCHE	SPP.	6	58	65	88	55	70	60				
2/25/2019	C1	BAETIS	SPP.	4	53	31	29	32						
2/25/2019	C1	EPHEMERELLA	DOROTHEA	23	74	69	67	61	56	53	45	46	82	79
2/25/2019	C1	MACCAFFERTIUM	MODESTUM	7	49	83	80	86	72	82	142			

2/25/2019	C1	ALLOPERLA	SPP.	1	66									
2/25/2019	C1	PERLINELLA	DRYMO	1	64									
2/25/2019	C1	APHINEMURA	SPP.	1	59									
2/25/2019	C1	HYDROPSYCHE	BETTENI	9	104	84	106	82	84	58	42	46	18	
2/25/2019	C2	EPHEMERELLA	DOROTHEA	19	77	64	69	76	47	66	67	56	51	61
2/25/2019	C2	MACCAFFERTIUM	MODESTUM	6	79	90	127	102	134	135				
2/25/2019	C2	ALLOPERLA	SPP.	10	68	84	46	60	73	59	64	42	68	44
2/25/2019	C2	DIPLECTRONA	MODESTA	1	76									
2/25/2019	C2	HYDROPSYCHE	BETTENI	1	109	58	62	78	46	36	52			
2/25/2019	C2	PYCNOPSYCHE	SCABRIPENNIS	1	83									
2/25/2019	C2	NEOPHYLAX	OLIGIUS	10	73									
2/25/2019	D1	MACCAFFERTIUM	MODESTUM	1	70									
2/25/2019	D1	CHEUMATOPSYCHE	SPP.	42	79	89	90	96	71	105	98	54	82	92
2/25/2019	D2	CHEUMATOPSYCHE	SPP.	42	97	84	92	88	82	48	54	40	50	32
2/25/2019	D2	HYDROPSYCHE	BETTENI	4	82	82	118	53						
2/25/2019	P1	CHEUMATOPSYCHE	SPP.	3	94	64	62							

2/26/2019	A1	CHEUMATOPSYCHE	SPP.	2	85	74								
2/26/2019	A1	HYDROPSYCHE	BETTENI	2	110	124								
2/26/2019	A1	NEOPHYLAX	OLIGIUS	3										
2/26/2019	A2	BAETIS	INTERCALARIS	4	57	60	61	37						
2/26/2019	A2	CHEUMATOPSYCHE	SPP.	10	82	94	85	65	66	98	81	73	53	38
2/26/2019	A3	PLAUDITUS	CESTUS	1	52									
2/26/2019	A3	MACCAFFERTIUM	MODESTUM	1	95									
2/26/2019	A3	CHEUMATOPSYCHE	SPP.	4	94	89	56	58						
2/26/2019	A4	BAETIS	INTERCALARIS	11	64	53	62	48	65	64	48	37	32	46
2/26/2019	A4	MACCAFFERTIUM	MODESTUM	1	93									
2/26/2019	A4	CHEUMATOPSYCHE	SPP.	5	123	88	86	84	134					
2/26/2019	R1	BAETIS	INTERCALARIS	2	76	66								
2/26/2019	R1	EPHEMERELLA	DOROTHEA	1	96									
7/15/2019	C1	BAETIS	INTERCALARIS	2	41	33								
7/15/2019	C1	PLAUDITUS	CESTUS	3	77	92	69							
7/15/2019	C1	EPHEMERELLA	DOROTHEA	2	49	38								

7/15/2019	C1	MACCAFFERTIUM	MODESTUM	6	73	56	44	56	40	34				
7/15/2019	C1	ECCOPTURA	XANTHENES	9	68	59	49	46	50	53	59	58	36	
7/15/2019	C1	CHEUMATOPSYCHE	SPP.	18	57	78	94	83	43	47	54	32	42	81
7/15/2019	C1	HYDROPSYCHE	BETTENI	68	67	54	48	84	54	104	97	94	96	102
7/15/2019	C2	MACCAFFERTIUM	MODESTUM	7	78	89	71	46	34	38				
7/15/2019	C2	PERLINELLA	DRYMO	7	41	48	32	72	38	62	55			
7/15/2019	C2	CHEUMATOPSYCHE	SPP.	4										
7/15/2019	C2	DIPLECTRONA	MODESTA	1	87									
7/15/2019	C2	HYDROPSYCHE	BETTENI	2	106	82								
7/15/2019	C2	LEPIDOSTOMA	SPP.	1										
7/15/2019	D1	CHEUMATOPSYCHE	SPP.	29										
7/15/2019	D1	HYDROPSYCHE	BETTENI	10	96	73	63	54	56	93	72	84	82	54
7/15/2019	D2	CHEUMATOPSYCHE	SPP.	25	88	82	71	79	43	77	54	44	62	76
7/15/2019	D2	HYDROPSYCHE	BETTENI	5	92	94	52							
7/15/2019	P1	AMELETUS	LINEATUS	1										
7/15/2019	P1	CHEUMATOPSYCHE	SPP.	151	88	82	54	76	91	58	68	78	84	46

7/15/2019	P1	HYDROPSYCHE	BETTENI	67	104	109	107	94	91	98	82	74	62	49
7/17/2019	A1			1	68									
7/17/2019	A1	BAETIS	INTERCALARIS	5	77	77	91	67	76					
7/17/2019	A1	EPHEMERELLA	DOROTHEA	1										
7/17/2019	A1	MACCAFFERTIUM	MODESTUM	2	72	43								
7/17/2019	A1	CHEUMATOPSYCHE	SPP.	86	72	70	75	73	49	62	71	68	74	78
7/17/2019	A1	HYDROPSYCHE	BETTENI	30	53	58	54	72	74	87	95	109	104	68
7/17/2019	A2	MACCAFFERTIUM	MODESTUM	1	70									
7/17/2019	A2	CHEUMATOPSYCHE	SPP.	36	72	97	58	88	82	86	91	52	49	54
7/17/2019	A2	HYDROPSYCHE	BETTENI	11	111	94	116	104	92	95	56	62	38	62
7/17/2019	A3	BAETIS	INTERCALARIS	22	62	67	74	67	71	72	74	79	71	61
7/17/2019	A3	CHEUMATOPSYCHE	SPP.	63	57	54	52	72	73	84	71	74	66	59
7/17/2019	A3	HYDROPSYCHE	BETTENI	106	82	96	89	78	112	82	61	70	64	42
7/17/2019	A4	BAETIS	INTERCALARIS	1	41									
7/17/2019	A4	MACCAFFERTIUM	MODESTUM	7	86	82	55	43	49	42	36			
7/17/2019	A4	CHEUMATOPSYCHE	SPP.	23	83	79	82	86	88	96	69	86	74	49

7/17/2019	A4	HYDROPSYCHE	BETTENI	7	89	108	111	106	61	48	37				
7/17/2019	R1	BAETIS	INTERCALARIS	4	49	41	59	37							
7/17/2019	R1	DANNELLA	SIMPLEX	3	66	67	70								
7/17/2019	R1	MACCAFFERTIUM	MODESTUM	19	94	83	74	61	62	43	56	45	44	49	
7/17/2019	R1	CHEUMATOPSYCHE	SPP.	19	79	78	94	82	41	52	52	38	32	28	
7/17/2019	R2	MACCAFFERTIUM	MODESTUM	14	81	65	56	75	65	52	46	45	39	37	
7/17/2019	R2	CHEUMATOPSYCHE	SPP.	48	64	85	89	84	69	85	88	67	49	51	
7/17/2019	R2	HYDROPSYCHE	BETTENI	48	84	74	86	74	88	77	46	34	38	32	
7/17/2019	R2	CHIMARRA	SPP.	1											
11/20/2019	C1	MACCAFFERTIUM	MODESTUM	2	57	64									
11/20/2019	C1	CHEUMATOPSYCHE	SPP.	7	71	70	79	54	68	46	62				
11/20/2019	C1	HYDROPSYCHE	BETTENI	7	81	67	89	67	58	47	38				
11/20/2019	C2	ALLOPERLA	SPP.	3	58	65	62								
11/20/2019	C2	CHEUMATOPSYCHE	SPP.	1	78										
11/20/	D1	BAETIS	SPP.	1	72										

2019														
11/20/2019	D1	MACCAFFERTIUM	MODESTUM	3	67	42	29							
11/20/2019	D1	ALLOPERLA	SPP.	3	83	99	77							
11/20/2019	D1	CHEUMATOPSYCHE	SPP.	1	84									
11/20/2019	D2	BAETIS	SPP.	5	83	69	83	66	48					
11/20/2019	D2	CHEUMATOPSYCHE	SPP.	5	87	62	51	62	34					
11/20/2019	D2	HYDROPSYCHE	BETTENI	1	104									
11/20/2019	D2	CHIMARRA	SPP.	1	89									
11/22/2019	A1	BAETIS	SPP.	1	61									
11/22/2019	A1	DANNELLA	SIMPLEX	9	53	53	51	45	56	51	53	58	42	
11/22/2019	A1	MACCAFFERTIUM	MODESTUM	1	82									
11/22/2019	A1	PERLINELLA	DRYMO	1	55									
11/22/2019	A2	BAETIS	INTERCALARIS	6	49	46	34	51	38	37				

11/22/2019	A2	EPHEMERELLA	DOROTHEA	2	52	56								
11/22/2019	A2	MACCAFFERTIUM	MODESTUM	2	69	83								
11/22/2019	A2	CHEUMATOPSYCHE	SPP.	3	94	67	54							
11/22/2019	R1	EPHEMERELLA	DOROTHEA	5	62	49	53	39	44					
11/22/2019	R1	MACCAFFERTIUM	MODESTUM	101	74	64	53	61	42	47	51	50	25	31
11/22/2019	R1	HYDROPSYCHE	BETTENI	2	93	36								
11/22/2019	R1	CHIMARRA	SPP.	11	67	84	88	62	58	58	54	57	82	54
11/22/2019	R2	BAETIS	INTERCALARIS	3	71	48	39							
11/22/2019	R2	EPHEMERELLA	DOROTHEA	1	53									
11/22/2019	R2	MACCAFFERTIUM	MODESTUM	17	83	68	66	58	86	70	81	62	66	76
11/22/2019	R2	CHEUMATOPSYCHE	SPP.	5	98	84	76	61	38					
11/22/2019	R2	HYDROPSYCHE	BETTENI	3	86	82	118							
11/22/	R2	CHIMARRA	SPP.	1	94									

2019															
2/14/2020	A1	MACCAFFERTIUM	MODESTUM	32	93	99	91	111	76	81	69	74	85	60	
2/14/2020	A1	CHEUMATOPSYCHE	SPP.	5	104	84	94	89	92						
2/14/2020	A1	HYDROPSYCHE	BETTENI	1	94										
2/14/2020	A1	CHIMARRA	SPP.	2	78	82									
2/14/2020	A2	BAETIS	SPP.	5	69	70	66	92	73						
2/14/2020	A2	MACCAFFERTIUM	MODESTUM	10	95	81	81	99	74	84	102	52	94	59	
2/14/2020	A2	CHEUMATOPSYCHE	SPP.	3	75	42	46								
2/14/2020	A2	HYDROPSYCHE	BETTENI	4	118	116	91	71							
2/14/2020	A3	DANNELLA	SIMPLEX	1	61										
2/14/2020	A4	MACCAFFERTIUM	MODESTUM	1	76										
2/14/2020	C1	BAETIS	SPP.	1	98										
2/14/2020	C1	DANNELLA	SIMPLEX	3	29	61	60								
2/14/2020	C1	MACCAFFERTIUM	MODESTUM	4	82	57	44	29							
2/14/2020	C1	ECCOPTURA	XANTHENES	3	112	96	76								
2/14/2020	C1	CHEUMATOPSYCHE	SPP.	2	84	56									

2/14/2020	C1	DIPLECTRONA	MODESTA	1	131									
2/14/2020	C1	HYDROPSYCHE	BETTENI	3	134	123	94							
2/14/2020	C1	LEPIDOSTOMA	SPP.	14	82	81	88	94	68	78	72	84	83	81
2/14/2020	C2	EPHEMERELLA	DOROTHEA	16	73	71	89	62	71	74	74	63	67	68
2/14/2020	C2	MACCAFFERTIUM	MODESTUM	23	87	79	97	126	74	66	53	57	81	36
2/14/2020	C2	CHEUMATOPSYCHE	SPP.	8	109	84	94	108	84	88	78	91		
2/14/2020	C2	HYDROPSYCHE	BETTENI	1	89									
2/14/2020	C2	LEPIDOSTOMA	SPP.	4	238	163	142	44						
2/14/2020	D1	DANNELLA	SIMPLEX	1	25									
2/14/2020	D1	MACCAFFERTIUM	MODESTUM	1	71									
2/14/2020	D1	CHEUMATOPSYCHE	SPP.	1	94									
2/14/2020	D2	CHEUMATOPSYCHE	SPP.	6	91	89	76	86	54	52				
2/14/2020	R1	BAETIS	SPP.	11	93	66	84	87	79	89	61	64	69	66
2/14/2020	R1	DANNELLA	SIMPLEX	2	49	58								
2/14/2020	R1	MACCAFFERTIUM	MODESTUM	146	46	95	79	98	61	60	71	54	68	49
2/14/2020	R1	CHEUMATOPSYCHE	SPP.	9	78	32	58	72	92	78	86	82	84	

2/14/2020	R1	HYDROPSYCHE	BETTENI	3	98	76	78							
2/14/2020	R1	CHIMARRA	SPP.	20	78	89	74	79	56	73	76	51	76	61
2/14/2020	R2	MACCAFFERTIUM	MODESTUM	61	92	86	80	93	100	94	90	69	84	62
2/14/2020	R2	CHEUMATOPSYCHE	SPP.	19	86	81	79	84	76	87	64	62	63	49
2/14/2020	R2	HYDROPSYCHE	BETTENI	7	92	76	86	96	136	84	98			
2/14/2020	R2	CHIMARRA	SPP.	21	68	84	86	95	94	82	72	88	82	92
2/14/2020	P1	CHEUMATOPSYCHE	SPP.	2	63	96								
7/28/2020	A1	DANNELLA	SIMPLEX	35	61	88	86	82	73	67	72	62	72	63
7/28/2020	A1	MACCAFFERTIUM	MODESTUM	27	62	64								
7/28/2020	A2	MACCAFFERTIUM	MODESTUM	1	58									
7/28/2020	A2	CHEUMATOPSYCHE	SPP.	1	61									
7/28/2020	A2	HYDROPSYCHE	BETTENI	1	108									
7/28/2020	A3			1	39									
7/28/2020	A3	CHEUMATOPSYCHE	SPP.	6	86	74	64	54	82	56				
7/28/2020	A3	HYDROPSYCHE	BETTENI	3	62	68								
7/28/2020	A4	EPHEMERELLA	DOROTHEA	1	61									

7/28/2020	C1	MACCAFFERTIUM	MODESTUM	3	62	57	44							
7/28/2020	C1	ECCOPTURA	XANTHENES	17	62	95	69	59	54	58	49	56	52	52
7/28/2020	C1	CHEUMATOPSYCHE	SPP.	2	75	77								
7/28/2020	C1	LEPIDOSTOMA	SPP.	3	78	76	84							
7/28/2020	C2	MACCAFFERTIUM	MODESTUM	7	89	78	77	68	57	83				
7/28/2020	C2	ALLOPERLA	SPP.	3	40	38	42							
7/28/2020	C2	ECCOPTURA	XANTHENES	11	44	55	66	56	51	45	47	44	41	39
7/28/2020	C2	PERLINELLA	EPHYRE	4	61	64	55	53						
7/28/2020	C2	CHEUMATOPSYCHE	SPP.	6	66	78	84	92	96	98				
7/28/2020	C2	HYDROPSYCHE	BETTENI	5	94	74	60	78	72					
7/28/2020	C2	PYCNOPSYCHE	SCABRIPENNIS	11	72	64	69	70	88	75	60	56	78	156
7/28/2020	D1	BAETIS	SPP.	1	72									
7/28/2020	D1	DANNELLA	SIMPLEX	2	48	58								
7/28/2020	D1	MACCAFFERTIUM	MODESTUM	5	59	81	58	56	56					
7/28/2020	D1	CHEUMATOPSYCHE	SPP.	2	72	94								
7/28/2020	D2	BAETIS	SPP.	2	85	69								

7/28/2020	D2	MACCAFFERTIUM	MODESTUM	1	81									
7/28/2020	D2	CHEUMATOPSYCHE	SPP.	3	70	71	66							
7/28/2020	D2	HYDROPSYCHE	BETTENI	7	108	125	132	97	89	118	64			
7/28/2020	R1	DANNELLA	SIMPLEX	4	52	63	65	61						
7/28/2020	R1	MACCAFFERTIUM	MODESTUM	31	66	51	55	69	52	63	46	45	46	47
7/28/2020	R1	CHIMARRA	SPP.	1	78									
7/28/2020	R1	HYDROPSYCHE	BETTENI	1	79									
7/28/2020	R1	CHEUMATOPSYCHE	SPP.	4	96	62	67	93						
7/28/2020	R2	MACCAFFERTIUM	MODESTUM	27	68	58	56	59	53	52	45	42	32	48
7/28/2020	R2	CHEUMATOPSYCHE	SPP.	2	74	94								
7/28/2020	P1	MACCAFFERTIUM	MODESTUM	3	94	74								
7/28/2020	P1	CHEUMATOPSYCHE	SPP.	5	79	82	59							
7/28/2020	P1	HYDROPSYCHE	BETTENI	3	81	94	64							

Appendix B4. Raw length measurements in millimeters for the EPT taxa across all sites from 2016-2020. The symbol '#' represents the species count for the respective date and site. The symbol 'L' represents the species length in millimeters. **Note highlighted cells represent species that were not able to be measured due to damage.*

DATE	SITE	GENUS	SPECIES	#	L 1	L 2	L 3	L 4	L 5	L 6	L 7	L 8	L 9	L 10
7/28/2016	A1	MACCAFFERTIUM	MODESTUM	3	4.356	5.049								
7/28/2016	A1	STENONEMA	FEMORATUM	2	4.059									
7/28/2016	A1	LEPIDOSTOMA	SPP.	2	8.019									
7/28/2016	A1	IRONOQUIA	PUNCTACISSIMA	1	6.039									
7/28/2016	A2	HABROPHLEBIA	SPP.	3	2.871	2.178								
7/28/2016	A2	PERLINELLA	DRYMO	2	7.524	4.950								
7/28/2016	A2	GOERA	CALCARATA	1	7.564									
7/28/2016	A2	CHEUMATOPSYCHE	SPP.	8	11.468	11.224	7.076	9.394	4.514	5.124	3.904	6.344		
7/28/2016	A2	LEPIDOSTOMA	SPP.	15	9.801	7.425	9.504	8.712	9.900					
7/28/2016	A2	OLIGOSTOMIS	SPP.	2										
7/28/2016	A3	STENONEMA	FEMORATUM	1	7.227									
7/28/2016	A3	HABROPHLEBIA	SPP.	1	3.267									
7/28/2016	A3	ALLOPERLA	SPP.	1										
7/28/2016	A3	PERLINELLA	DRYMO	4	5.742	5.544	7.227							
7/28/2016	A3	HYDROPSYCHE	BETTENI	1	6.138									
7/28/2016	A3	LEPIDOSTOMA	SPP.	3										
7/28/2016	A3	OLIGOSTOMIS	SPP.	2	8.019									

7/28/2016	A4	LEPIDOSTOMA	SPP.	1										
7/28/2016	R1	BAETIS	INTERCALARIS	3	4.158	4.059								
7/28/2016	R1	MACCAFFERTIUM	MODESTUM	3	5.346	7.326								
7/28/2016	R1	STENONEMA	FEMORATUM	2	5.049	6.336								
7/28/2016	R1	PTILOSTOMIS	SPP.	2	10.248	10.370								
7/28/2016	R2	BAETIS	INTERCALARIS	2	3.762									
7/28/2016	R2	MACCAFFERTIUM	MODESTUM	2	5.940	3.069								
7/28/2016	R2	CHEUMATOPSYCHE	SPP.	4	12.810	9.150	8.784	3.410						
7/28/2016	R2	DIPLECTRONA	MODESTA	3	9.150	9.516	5.742							
7/28/2016	P1	CHIMARRA	SPP.	1										
7/28/2016	C1	BAETIS	INTERCALARIS	1										
7/28/2016	C1	PERLINELLA	DRYMO	2	6.534	3.861								
7/28/2016	C1	DIPLECTRONA	MODESTA	1	7.623									
7/28/2016	C1	HYDROPSYCHE	BETTENI	5										
7/28/2016	C1	LEPIDOSTOMA	SPP.	1										
7/28/2016	C2	MACCAFFERTIUM	MODESTUM	1	10.126									
7/28/2016	C2	PERLINELLA	DRYMO	2	6.344	5.368								
7/28/2016	C2	HYDROPSYCHE	BETTENI	2	11.712	9.882								
7/28/2016	C2	LEPIDOSTOMA	SPP.	1										
7/28/2016	C2	NEOPHYLAX	OLIGIUS	9										

11/14/2016	A1	MACCAFFERTIUM	MODESTUM	1	5.544									
11/14/2016	A1	ALLOCAPNIA	SPP.	36	5.346	5.148	4.950	5.148	4.950	5.049	5.247	3.861	3.366	4.158
11/14/2016	A2	EURYLOPHELLA	DORIS	1	4.356									
11/14/2016	A2	MACCAFFERTIUM	MODESTUM	4	4.455	4.950	3.960	8.662						
11/14/2016	A2	ALLOCAPNIA	SPP.	53	4.653	6.237	6.732	5.148	5.049	4.851	3.564	4.059	5.445	6.138
11/14/2016	A2	ECCOPTURA	XANTHENES	1	7.326									
11/14/2016	A2	PERLINELLA	DRYMO	1	6.831									
11/14/2016	A2	CHEUMATOPSYCHE	SPP.	1	5.445									
11/14/2016	A2	HYDROPSYCHE	BETTENI	2	11.712	8.662								
11/14/2016	A3	ALLOCAPNIA	SPP.	6	4.851	5.049	3.960	4.356	2.475					
11/14/2016	A4	ALLOCAPNIA	SPP.	3	2.871	2.475								
11/14/2016	R1	MACCAFFERTIUM	MODESTUM	3	7.128	7.524	5.643							
11/14/2016	R1	ALLOCAPNIA	SPP.	7	4.752									
11/14/2016	R1	HYDROPSYCHE	BETTENI	3	12.078	6.344	8.540							
11/14/2016	R2	PERLINELLA	DRYMO	1	6.222									
11/14/2016	R2	PERLINELLA	EPHYRE	1	7.227									
11/14/2016	R2	HYDROPSYCHE	BETTENI	3	5.742	4.257	4.950							
11/16/2016	C2	EURYLOPHELLA	DORIS	1	4.158									
11/16/2016	C2	MACCAFFERTIUM	MODESTUM	1	9.207									
11/16/2016	C2	ALLOCAPNIA	SPP.	6	2.376	6.138	2.574	3.168	2.970					

11/16/2016	C2	PERLINELLA	DRYMO	2	8.118	6.237								
11/16/2016	C2	PERLINELLA	EPHYRE	1	9.603									
11/16/2016	C2	DIPLECTRONA	MODESTA	2										
11/16/2016	C2	HYDROPSYCHE	BETTENI	6	9.207	3.465	5.841	11.590	3.762	3.564				
11/16/2016	C2	PYCNOPSYCHE	SCABRIPENNIS	1										
3/17/2017	A1	BAETIS	INTERCALARIS	9	11.590	5.643	5.346	5.445	6.138	5.148	5.049			
3/17/2017	A1	BAETIS	SPP.	294	3.861	4.554	5.148	4.950	3.960	3.762	4.356	3.762	4.158	3.762
3/17/2017	A1	EPHEMERELLA	DOROTHEA	74	7.722	8.514	8.514	7.524	8.118	8.316	8.712	8.415	7.623	7.920
3/17/2017	A1	MACCAFFERTIUM	MODESTUM	2	7.128	8.613	4.554							
3/17/2017	A1	ALLOPERLA	SPP.	28	5.148	3.663	5.742	6.237	5.148	5.148	4.950	4.851	4.158	4.752
3/17/2017	A1	APHINEMURA	SPP.	21	6.039	5.346	4.455	5.049	6.039	6.435	3.861	4.950	5.742	6.336
3/17/2017	A1	ISOPERLA	TRANSMARINA	30	9.207	9.405	9.504	4.257	3.465	3.564	4.158	4.455	4.752	3.762
3/17/2017	A1	IRONOQUIA	PUNCTACISSIMA	2	17.690	20.374								
3/17/2017	A1	NEOPHYLAX	OLIGIUS	1										
3/17/2017	A2	BAETIS	INTERCALARIS	4	3.465									
3/17/2017	A2	EPHEMERELLA	DOROTHEA	1	8.910									
3/17/2017	A2	MACCAFFERTIUM	MODESTUM	1	3.663									
3/17/2017	A2	ALLOPERLA	SPP.	8	4.851	4.059	4.257	4.455	4.554	4.752				
3/17/2017	A2	APHINEMURA	SPP.	1	4.257									
3/17/2017	A2	LEPIDOSTOMA	SPP.	3	6.732	12.810	19.886							
3/17/2017	A2	NEOPHYLAX	OLIGIUS	20	8.712	7.128								

3/17/2017	A3	BAETIS	INTERCALARIS	4	5.643	7.920	10.492	13.054						
3/17/2017	A3	EPHEMERELLA	DOROTHEA	4	8.415	6.732	4.653	7.524						
3/17/2017	A3	MACCAFFERTIUM	MODESTUM	1	3.663									
3/17/2017	A3	ALLOPERLA	SPP.	8	4.158	4.851	3.366	4.851	3.762	3.267	3.069	3.960		
3/17/2017	A3	APHINEMURA	SPP.	3	4.950	4.455	3.960							
3/17/2017	A3	DIPLOPERLA	DUPLICATA	1	1.881									
3/17/2017	A3	LEPIDOSTOMA	SPP.	1	13.420									
3/17/2017	A3	NEOPHYLAX	OLIGIUS	15	8.910									
3/17/2017	A4	BAETIS	INTERCALARIS	3	3.861	3.663	3.663							
3/17/2017	A4	EPHEMERELLA	DOROTHEA	1	7.722									
3/17/2017	A4	ALLOPERLA	SPP.	1	3.564									
3/17/2017	A4	APHINEMURA	SPP.	15	5.148	5.049	5.346	6.237	5.445	5.643	5.148	5.247	4.950	3.267
3/17/2017	A4	ISOPERLA	TRANSMARINA	5	2.772	3.465	3.861	4.257	3.069					
3/17/2017	A4	CHEUMATOPSYCHE	SPP.	1	10.248									
3/17/2017	A4	HYDROPSYCHE	BETTENI	1	13.420									
3/17/2017	A4	NEOPHYLAX	OLIGIUS	20	7.128	5.742	6.831	6.138	8.316					
3/17/2017	C1	EPHEMERELLA	DOROTHEA	1	2.475									
3/17/2017	C1	MACCAFFERTIUM	MODESTUM	2	12.810	9.272								
3/17/2017	C1	PERLINELLA	DRYMO	2	2.673	2.574								
3/17/2017	C1	ANISOCENTROPUS	PYRALOIDES	1	26.962									

3/17/2017	C1	NEOPHYLAX	OLIGIUS	29	7.564	8.418	6.344							
3/17/2017	C2	BAETIS	INTERCALARIS	1	0.000									
3/17/2017	C2	DANNELLA	SIMPLEX	2	7.920	8.712								
3/17/2017	C2	EPHEMERELLA	DOROTHEA	2	5.841	3.168								
3/17/2017	C2	MACCAFFERTIUM	MODESTUM	2	8.415	7.821								
3/17/2017	C2	ALLOPERLA	SPP.	1	6.237									
3/17/2017	C2	PERLINELLA	DRYMO	2	2.277									
3/17/2017	C2	APHINEMURA	SPP.	1	4.851									
3/17/2017	C2	CHEUMATOPSYCHE	SPP.	2	5.445	12.810								
3/17/2017	C2	LEPIDOSTOMA	SPP.	1	3.168									
3/17/2017	C2	NEOPHYLAX	OLIGIUS	37	7.425	7.623								
3/17/2017	D2	MACCAFFERTIUM	MODESTUM	2	6.534	8.316								
3/17/2017	D2	LEPIDOSTOMA	SPP.	1	5.841									
3/17/2017	D2	NEOPHYLAX	OLIGIUS	10										
3/17/2017	R1	BAETIS	INTERCALARIS	16	12.688	5.002	5.124	5.246	3.782	4.270	3.416	4.636	3.294	3.172
3/17/2017	R1	EPHEMERELLA	DOROTHEA	2	7.128	6.930								
3/17/2017	R1	MACCAFFERTIUM	MODESTUM	1	12.200									
3/17/2017	R1	PERLINELLA	DRYMO	1	11.102									
3/17/2017	R1	APHINEMURA	SPP.	1	5.643									
3/17/2017	R1	NEOPHYLAX	OLIGIUS	3	6.435									

3/17/2017	R2	BAETIS	INTERCALARIS	2	5.148	3.564								
3/17/2017	R2	EPHEMERELLA	DOROTHEA	5	9.009	8.712	7.524	8.316	8.415					
3/17/2017	R2	MACCAFFERTIUM	MODESTUM	4	10.980	9.801	9.207	5.742						
3/17/2017	R2	CHEUMATOPSYCHE	SPP.	1	11.224									
3/17/2017	P1	MACCAFFERTIUM	MODESTUM	1	8.613									
6/20/2017	A1	IRONOQUIA	PUNCTACISSIMA	1	7.227									
6/20/2017	A3	MACCAFFERTIUM	MODESTUM	1	7.920									
6/20/2017	A3	PERLINELLA	DRYMO	1	6.831									
6/20/2017	A3	CHEUMATOPSYCHE	SPP.	1	10.980									
6/20/2017	A3	HYDROPSYCHE	BETTENI	1	10.004									
6/20/2017	A3	NEOPHYLAX	OLIGIUS	21	0.000									
6/20/2017	A4	HYDROPSYCHE	BETTENI	1	9.306									
6/20/2017	A4	NEOPHYLAX	OLIGIUS	26	0.000									
6/20/2017	R1	MACCAFFERTIUM	MODESTUM	1	5.148									
6/20/2017	R1	CHEUMATOPSYCHE	SPP.	2	2.970	7.920								
6/20/2017	R1	HYDROPSYCHE	BETTENI	1	9.405									
6/20/2017	R2	HYDROPSYCHE	BETTENI	3	11.224	1.782	2.673							
6/20/2017	P1	MACCAFFERTIUM	MODESTUM	5	7.722	5.643	4.752	5.445	4.158					

6/20/2017	P1	CHEUMATOPSYCHE	SPP.	18	11.956	8.217	9.405	5.841	3.960	6.138	6.237	4.851	4.257	6.435
6/20/2017	P1	HYDROPSYCHE	BETTENI	1	12.200									
6/20/2017	P1	OLIGOSTOMIS	SPP.	1	0.000									
6/20/2017	P1	NEOPHYLAX	OLIGIUS	3	0.000									
6/21/2017	C2	MACCAFFERTIUM	MODESTUM	12	7.623	9.207	8.811	6.138	4.950	5.148	3.465	3.069	3.267	
6/21/2017	C2	PERLINELLA	DRYMO	3	4.059	3.465	2.970							
6/21/2017	C2	DIPLECTRONA	MODESTA	30	11.088	9.504	9.900	9.207	8.217	7.425	5.368	10.004	6.710	5.978
6/21/2017	C2	PSILOTRETA	SPP.	3	3.564	2.475	2.871							
6/21/2017	C2	NEOPHYLAX	OLIGIUS	18	3.564									
6/21/2017	D1	BAETIS	SPP.	1	2.871									
6/21/2017	D1	MACCAFFERTIUM	MODESTUM	1	3.069									
6/21/2017	D1	HYDROPSYCHE	BETTENI	18	7.227	6.336	9.108	6.930	7.128	4.950	3.960	4.653	4.554	3.069
6/21/2017	D1	NEOPHYLAX	OLIGIUS	1										
6/21/2017	D2	MACCAFFERTIUM	MODESTUM	6	6.732	7.029	6.732	4.851	5.544	3.762				
6/21/2017	D2	CHEUMATOPSYCHE	SPP.	7	8.118	8.118	8.910	7.821	5.148	5.940	6.138			
6/21/2017	D2	HYDROPSYCHE	BETTENI	5	3.267	8.613	7.029	9.306	9.603					
6/21/2017	D2	NEOPHYLAX	OLIGIUS	1	0.000									
10/18/2017	A1	BAETIS	SPP.	3	3.366	4.158								
10/18/2017	A1	MACCAFFERTIUM	MODESTUM	7	6.336	4.059								

10/18/2017	A1	CHEUMATOPSYCHE	SPP.	4	7.425	6.435	8.217	7.425						
10/18/2017	A2	MACCAFFERTIUM	MODESTUM	9	5.148	4.554	4.554	4.653	5.148	3.663	4.257	2.871	2.178	
10/18/2017	A3	NEOPHYLAX	OLIGIUS	6										
10/18/2017	A4	DIPLECTRONA	MODESTA	1	9.603									
10/18/2017	A4	NEOPHYLAX	OLIGIUS	11										
10/18/2017	R1	MACCAFFERTIUM	MODESTUM	4	3.564	7.227	4.356	3.663						
10/18/2017	R2	BAETIS	SPP.	9	5.148	4.653	3.564	5.643	4.455	3.960	3.861	4.554	5.148	
10/18/2017	R2	MACCAFFERTIUM	MODESTUM	14	6.039	6.831	4.752	4.356	3.861	4.950	3.663	4.554	4.257	5.148
10/18/2017	R2	CHEUMATOPSYCHE	SPP.	23	7.425	7.227	13.420	11.834	9.394	9.638	12.810	6.930	5.940	4.653
10/18/2017	R2	CHIMARRA	SPP.	3	5.940	3.960								
10/19/2017	C2	MACCAFFERTIUM	MODESTUM	2	9.504									
10/19/2017	C2	PERLINELLA	DRYMO	1	6.930									
10/19/2017	C2	DIPLECTRONA	MODESTA	2	8.316	6.138								
10/19/2017	C2	LEPIDOSTOMA	SPP.	2	5.148	3.663								
10/19/2017	D1	MACCAFFERTIUM	MODESTUM	2	5.841	5.148								
10/19/2017	D1	CHEUMATOPSYCHE	SPP.	10	5.148	5.742	5.445	9.702	7.029	8.118	4.356	3.465	11.590	11.590
10/19/2017	D2	CHIMARRA	SPP.	1	6.435									
10/19/2017	D2	NEOPHYLAX	OLIGIUS	3										
2/18/2018	A1	EPHEMERELLA	DOROTHEA	2	9.702	7.623								

2/18/2018	A1	MACCAFFERTIUM	MODESTUM	2	9.882	9.394								
2/18/2018	A1	CHEUMATOPSYCHE	SPP.	1	10.492									
2/18/2018	A1	LEPIDOSTOMA	SPP.	1	2.871									
2/18/2018	A3	EPHEMERELLA	DOROTHEA	23	9.702	6.534	7.920	5.247	5.940	7.821	3.861	6.831	4.653	3.465
2/18/2018	A3	MACCAFFERTIUM	MODESTUM	2	4.514	11.102								
2/18/2018	A3	LEPIDOSTOMA	SPP.	1	2.772									
2/18/2018	A3	PYCNOPSYCHE	SCABRIPENNIS	1	4.653									
2/18/2018	A3	CHIMARRA	SPP.	5	10.370	9.760	6.710	5.978	7.564					
2/18/2018	A3	NEOPHYLAX	OLIGIUS	2	5.734	5.856								
2/18/2018	A4	IRONOQUIA	PUNCTACISSIMA	1	3.960									
2/18/2018	A4	NEOPHYLAX	OLIGIUS	10										
2/18/2018	C2	DANNELLA	SIMPLEX	4	6.435									
2/18/2018	C2	MACCAFFERTIUM	MODESTUM	10	9.207									
2/18/2018	C2	ECCOPTURA	XANTHENES	2	12.810	19.398								
2/18/2018	C2	ANISOCENTROPUS	PYRALOIDES	1	14.274									
2/18/2018	C2	DIPLECTRONA	MODESTA	3	14.518	11.224	3.416							
2/18/2018	C2	LEPIDOSTOMA	SPP.	9	3.267	3.168	4.356	2.772	2.376	3.168	2.178	2.178		
2/18/2018	C2	PYCNOPSYCHE	SCABRIPENNIS	3	7.442	9.150	10.736							
2/18/2018	C2	RHYACOPHILA	SPP.	2	12.566	13.664								
2/18/2018	R1	MACCAFFERTIUM	MODESTUM	6	5.247	8.613	4.653	4.554	3.168	3.564				

2/18/2018	R2	EPHEMERELLA	DOROTHEA	1	4.257									
2/18/2018	R2	MACCAFFERTIUM	MODESTUM	7	5.643	5.841	3.861	9.405	7.128	4.455	5.247			
2/18/2018	R2	CHEUMATOPSYCHE	SPP.	2	13.786	13.054								
2/18/2018	R2	DIPLECTRONA	MODESTA	1	11.224									
2/18/2018	R2	LEPIDOSTOMA	SPP.	1	2.600									
2/18/2018	P1	BAETIS	SPP.	1	4.554									
2/18/2018	P1	MACCAFFERTIUM	MODESTUM	3	6.732	5.445	5.148							
2/18/2018	P1	DIPLECTRONA	MODESTA	2	13.298	11.712								
2/18/2018	P1	PYCNOPSYCHE	SCABRIPENNIS	4	8.118	3.762	4.653	28.670						
8/16/2018	C1	BAETIS	SPP.	1	4.158									
8/16/2018	C1	DIPLECTRONA	MODESTA	3	13.176	9.516								
8/16/2018	C2	DANNELLA	SIMPLEX	2	3.168	2.970								
8/16/2018	C2	MACCAFFERTIUM	MODESTUM	3	5.247	5.940	3.366							
8/16/2018	C2	CHEUMATOPSYCHE	SPP.	1	10.492									
8/16/2018	C2	LEPIDOSTOMA	SPP.	3	4.158	7.128	3.267							
8/16/2018	C2	PYCNOPSYCHE	SCABRIPENNIS	2	15.372									
8/16/2018	C2	CHIMARRA	SPP.	1	6.930									
8/16/2018	C2	NEOPHYLAX	OLIGIUS	13	6.930									
8/16/2018	D1	PLAUDITUS	CESTUS	8	7.029	3.960	3.762	3.861	4.158	5.940	5.049	6.633	5.643	4.158
8/16/2018	D1	PERLINELLA	DRYMO	1	5.544									

8/16/2018	D1	CHEUMATOPSYCHE	SPP.	8	9.108	6.138	7.425	8.316	8.712	9.108	5.742	4.752		
8/17/2018	A3	BAETIS	SPP.	10	7.029	5.940	5.445	6.633	5.247	4.554	5.445	5.742	4.455	4.356
8/17/2018	A4	BAETIS	SPP.	2	5.148									
8/17/2018	R1	BAETIS	SPP.	2	3.564									
8/17/2018	R1	CHEUMATOPSYCHE	SPP.	1	7.326									
8/17/2018	R2	BAETIS	INTERCALARIS	2	6.732	6.534								
8/17/2018	R2	MACCAFFERTIUM	MODESTUM	1	4.158									
8/17/2018	R2	CHEUMATOPSYCHE	SPP.	3	5.148	6.336	8.019							
11/8/2018	A1	BAETIS	INTERCALARIS	2	6.732	4.653								
11/8/2018	A1	CHEUMATOPSYCHE	SPP.	20	11.468	8.052	7.320	11.590	10.370	6.344	11.346	9.150	8.540	6.710
11/8/2018	A1	DIPLECTRONA	MODESTA	2	7.326	9.702								
11/8/2018	A1	CHIMARRA	SPP.	1	8.118									
11/8/2018	A2	BAETIS	SPP.	1	5.346									
11/8/2018	A2	DIPLECTRONA	MODESTA	6	8.712	9.504	6.138	4.356	3.267	2.475				
11/8/2018	A3	CHEUMATOPSYCHE	SPP.	1	6.633									
11/8/2018	A3	HYDROPSYCHE	BETTENI	1	4.356									
11/8/2018	A4	BAETIS	SPP.	6	4.851	3.663	5.643	4.059						
11/8/2018	A4	MACCAFFERTIUM	MODESTUM	1	4.851									
11/8/2018	A4	CHEUMATOPSYCHE	SPP.	4	8.019	8.118	4.257	5.148						

11/8/2018	A4	HYDROPSYCHE	BETTENI	2	4.356	4.158								
11/8/2018	C1	BAETIS	INTERCALARIS	18	5.346	6.831	4.851	5.247	6.138	5.148	5.346	6.138	4.752	6.633
11/8/2018	C1	DANNELLA	SIMPLEX	1	4.356									
11/8/2018	C1	MACCAFFERTIUM	MODESTUM	25	14.518	8.662	3.904	4.636	5.978	7.564	6.344	7.320	5.612	9.516
11/8/2018	C1	CHEUMATOPSYCHE	SPP.	33	7.425	7.623	7.227	9.108	9.306	9.108	5.346	10.858	10.980	10.736
11/8/2018	C1	DIPLECTRONA	MODESTA	1	14.884									
11/8/2018	C1	CHIMARRA	SPP.	1	7.524									
11/8/2018	C2	BAETIS	INTERCALARIS	1	6.435									
11/8/2018	C2	BAETIS	SPP.	1	3.069									
11/8/2018	C2	DANNELLA	SIMPLEX	1	3.762									
11/8/2018	C2	MACCAFFERTIUM	MODESTUM	7	7.326	7.920								
11/8/2018	C2	ALLOPERLA	SPP.	10	4.455	2.475	2.376	2.277	2.574	1.881	2.178	2.178		
11/8/2018	C2	PERLINELLA	DRYMO	4	8.217	6.138	5.544	5.247						
11/8/2018	C2	DIPLECTRONA	MODESTA	12	9.405	8.019	7.128	8.514	7.128	6.732	5.148	4.554	4.653	3.366
11/8/2018	C2	RHYACOPHILA	TORVA	2	9.306	5.643								
11/8/2018	D1	MACCAFFERTIUM	MODESTUM	2	7.128	4.653								
11/8/2018	D1	CHEUMATOPSYCHE	SPP.	162	9.760	9.150	10.370	6.466	7.564	7.808	9.394	3.660	3.172	3.050
11/8/2018	D2	HYDROPSYCHE	BETTENI	2	14.030									
11/8/2018	D2	CHEUMATOPSYCHE	SPP.	162	10.858	10.614	9.028	9.760	9.394	8.784	5.856	6.100	6.710	3.904

11/8/2018	P1	CHEUMATOPSYCHE	SPP.	6	5.742	6.435	4.400	2.750	3.500	3.000				
2/25/2019	C1	BAETIS	SPP.	4	5.247	3.069	2.871	3.168						
2/25/2019	C1	EPHEMERELLA	DOROTHEA	23	9.028	8.418	8.174	7.442	6.832	6.466	5.490	5.612	10.004	9.638
2/25/2019	C1	MACCAFFERTIUM	MODESTUM	7	4.851	8.217	9.760	10.492	8.784	10.004	17.324			
2/25/2019	C1	ALLOPERLA	SPP.	1	3.300									
2/25/2019	C1	PERLINELLA	DRYMO	1	7.808									
2/25/2019	C1	APHINEMURA	SPP.	1	2.950									
2/25/2019	C1	HYDROPSYCHE	BETTENI	9	12.688	10.248	12.932	10.004	10.248	7.076	5.124	5.612	2.196	
2/25/2019	C2	EPHEMERELLA	DOROTHEA	19	9.394	7.808	8.418	9.272	5.734	8.052	8.174	6.832	6.222	7.442
2/25/2019	C2	MACCAFFERTIUM	MODESTUM	6	9.638	10.980	15.494	12.444	16.348	16.470				
2/25/2019	C2	ALLOPERLA	SPP.	10	3.400	4.200	2.300	3.000	3.650	2.950	3.200	2.100	3.400	2.200
2/25/2019	C2	DIPLECTRONA	MODESTA	1	7.524									
2/25/2019	C2	HYDROPSYCHE	BETTENI	1	13.298	7.076	7.564	9.516	5.612	4.392	6.344			
2/25/2019	C2	PYCNOPSYCHE	SCABRIPENNIS	1	4.150									
2/25/2019	C2	NEOPHYLAX	OLIGIUS	10	8.906									
2/25/2019	D1	MACCAFFERTIUM	MODESTUM	1	8.540									
2/25/2019	D1	CHEUMATOPSYCHE	SPP.	42	9.638	10.858	10.980	11.712	8.662	12.810	11.956	6.588	10.004	11.224
2/25/2019	D2	CHEUMATOPSYCHE	SPP.	42	11.834	10.248	11.224	10.736	10.004	5.856	6.588	4.880	6.100	3.904
2/25/2019	D2	HYDROPSYCHE	BETTENI	4	10.004	10.004	14.396	6.466						

2/25/2019	P1	CHEUMATOPSYCHE	SPP.	3	11.468	7.808	7.564							
2/26/2019	A1	CHEUMATOPSYCHE	SPP.	2	10.370	9.028								
2/26/2019	A1	HYDROPSYCHE	BETTENI	2	13.420	15.128								
2/26/2019	A1	NEOPHYLAX	OLIGIUS	3										
2/26/2019	A2	BAETIS	INTERCALARIS	4	6.954	7.320	7.442	4.514						
2/26/2019	A2	CHEUMATOPSYCHE	SPP.	10	10.004	11.468	10.370	7.930	8.052	11.956	9.882	8.906	6.466	4.636
2/26/2019	A3	PLAUDITUS	CESTUS	1	6.344									
2/26/2019	A3	MACCAFFERTIUM	MODESTUM	1	11.590									
2/26/2019	A3	CHEUMATOPSYCHE	SPP.	4	11.468	10.858	6.832	7.076						
2/26/2019	A4	BAETIS	INTERCALARIS	11	6.336	5.247	6.138	4.752	6.435	6.336	4.752	3.663	3.168	4.554
2/26/2019	A4	MACCAFFERTIUM	MODESTUM	1	11.346									
2/26/2019	A4	CHEUMATOPSYCHE	SPP.	5	15.006	10.736	10.492	10.248	16.348					
2/26/2019	R1	BAETIS	INTERCALARIS	2	7.524	6.534								
2/26/2019	R1	EPHEMERELLA	DOROTHEA	1	11.712									
7/15/2019	C1	BAETIS	INTERCALARIS	2	4.059	3.267								
7/15/2019	C1	PLAUDITUS	CESTUS	3	3.850	4.600	3.450							
7/15/2019	C1	EPHEMERELLA	DOROTHEA	2	4.851	3.762								
7/15/2019	C1	MACCAFFERTIUM	MODESTUM	6	7.227	5.544	4.356	5.544	3.960	3.366				
7/15/2019	C1	ECCOPTURA	XANTHENES	9	6.732	5.841	4.851	4.554	4.950	5.247	5.841	5.742	3.564	

7/15/2019	C1	CHEUMATOPSYCHE	SPP.	18	5.643	7.722	9.306	8.217	4.257	4.653	5.346	3.168	4.158	8.019
7/15/2019	C1	HYDROPSYCHE	BETTENI	68	6.633	5.346	4.752	8.316	5.346	12.688	11.834	11.468	11.712	12.444
7/15/2019	C2	MACCAFFERTIUM	MODESTUM	7	4.836	5.518	7.029	4.554	3.366	3.762				
7/15/2019	C2	PERLINELLA	DRYMO	7	4.059	4.752	3.168	7.128	3.762	6.138	5.445			
7/15/2019	C2	CHEUMATOPSYCHE	SPP.	4										
7/15/2019	C2	DIPLECTRONA	MODESTA	1	10.614									
7/15/2019	C2	HYDROPSYCHE	BETTENI	2	12.932	5.084								
7/15/2019	C2	LEPIDOSTOMA	SPP.	1										
7/15/2019	D1	CHEUMATOPSYCHE	SPP.	29										
7/15/2019	D1	HYDROPSYCHE	BETTENI	10	9.504	7.227	6.237	5.346	5.544	4.650	3.600	4.200	4.100	2.700
7/15/2019	D2	CHEUMATOPSYCHE	SPP.	25	8.712	10.004	8.662	9.638	5.246	7.623	5.346	4.356	6.138	7.524
7/15/2019	D2	HYDROPSYCHE	BETTENI	5	11.224	11.468	6.344							
7/15/2019	P1	AMELETUS	LINEATUS	1										
7/15/2019	P1	CHEUMATOPSYCHE	SPP.	151	8.712	8.118	5.346	7.524	9.009	5.742	6.732	7.722	8.316	4.554
7/15/2019	P1	HYDROPSYCHE	BETTENI	67	12.688	13.298	13.054	11.468	11.102	11.956	10.004	7.326	6.138	4.851
7/17/2019	A1			1	3.400									
7/17/2019	A1	BAETIS	INTERCALARIS	5	3.850	3.850	4.550	3.350	3.800					
7/17/2019	A1	EPHEMERELLA	DOROTHEA	1										
7/17/2019	A1	MACCAFFERTIUM	MODESTUM	2	7.128	4.257								

7/17/2019	A1	CHEUMATOPSYCHE	SPP.	86	8.784	8.540	9.150	8.906	5.978	7.564	8.662	8.296	9.028	9.516
7/17/2019	A1	HYDROPSYCHE	BETTENI	30	5.247	5.742	5.346	7.128	9.028	10.614	11.590	13.298	12.688	6.732
7/17/2019	A2	MACCAFFERTIUM	MODESTUM	1	3.500									
7/17/2019	A2	CHEUMATOPSYCHE	SPP.	36	7.128	9.603	5.742	8.712	8.118	8.514	9.009	5.148	4.851	5.346
7/17/2019	A2	HYDROPSYCHE	BETTENI	11	13.542	11.468	14.152	12.688	4.600	4.750	2.800	5.580	3.762	3.100
7/17/2019	A3	BAETIS	INTERCALARIS	22	3.100	3.350	3.700	3.350	3.550	3.600	3.700	3.950	3.550	3.050
7/17/2019	A3	CHEUMATOPSYCHE	SPP.	63	5.643	5.346	5.148	7.128	7.227	10.248	8.662	9.028	8.052	7.198
7/17/2019	A3	HYDROPSYCHE	BETTENI	106	10.004	11.712	10.858	9.516	13.664	10.004	7.442	6.930	6.336	4.158
7/17/2019	A4	BAETIS	INTERCALARIS	1	4.059									
7/17/2019	A4	MACCAFFERTIUM	MODESTUM	7	10.492	10.004	6.710	5.246	5.978	5.124	4.392			
7/17/2019	A4	CHEUMATOPSYCHE	SPP.	23	8.217	7.821	8.118	8.514	8.712	9.504	6.831	8.514	7.326	4.851
7/17/2019	A4	HYDROPSYCHE	BETTENI	7	10.858	13.176	13.542	12.932	7.442	4.752	3.663			
7/17/2019	R1	BAETIS	INTERCALARIS	4	2.450	2.050	2.950	1.850						
7/17/2019	R1	DANNELLA	SIMPLEX	3	6.534	6.633	6.930							
7/17/2019	R1	MACCAFFERTIUM	MODESTUM	19	9.306	8.217	7.326	6.039	6.138	4.257	5.544	4.455	4.356	4.851
7/17/2019	R1	CHEUMATOPSYCHE	SPP.	19	9.638	7.722	9.306	8.118	4.059	5.148	5.148	3.762	3.168	2.772
7/17/2019	R2	MACCAFFERTIUM	MODESTUM	14	8.019	6.435	5.544	7.425	6.435	5.148	4.554	4.455	3.861	3.663

7/17/2019	R2	CHEUMATOPSYCHE	SPP.	48	6.336	8.415	8.811	8.316	6.831	5.270	5.456	3.350	2.450	5.049
7/17/2019	R2	HYDROPSYCHE	BETTENI	48	8.316	7.326	8.514	9.028	10.736	9.394	4.554	3.366	3.762	3.168
7/17/2019	R2	CHIMARRA	SPP.	1										
11/20/2019	C1	MACCAFFERTIUM	MODESTUM	2	5.643	6.336								
11/20/2019	C1	CHEUMATOPSYCHE	SPP.	7	8.662	8.540	9.638	6.588	8.296	5.612	7.564			
11/20/2019	C1	HYDROPSYCHE	BETTENI	7	9.882	8.174	10.858	6.633	5.742	4.653	3.762			
11/20/2019	C2	ALLOPERLA	SPP.	3	2.900	3.250	3.100							
11/20/2019	C2	CHEUMATOPSYCHE	SPP.	1	7.722									
11/20/2019	D1	BAETIS	SPP.	1	4.464									
11/20/2019	D1	MACCAFFERTIUM	MODESTUM	3	6.633	4.158	2.871							
11/20/2019	D1	ALLOPERLA	SPP.	3	4.150	4.950	3.850							
11/20/2019	D1	CHEUMATOPSYCHE	SPP.	1	8.316									
11/20/2019	D2	BAETIS	SPP.	5	5.146	4.278	5.146	4.092	2.976					
11/20/2019	D2	CHEUMATOPSYCHE	SPP.	5	8.613	6.138	5.049	6.138	3.366					
11/20/2019	D2	HYDROPSYCHE	BETTENI	1	12.688									
11/20/2019	D2	CHIMARRA	SPP.	1	8.811									
11/22/2019	A1	BAETIS	SPP.	1	3.050									
11/22/2019	A1	DANNELLA	SIMPLEX	9	3.286	3.286	3.162	2.790	3.472	3.162	3.286	3.596	2.604	
11/22/2019	A1	MACCAFFERTIUM	MODESTUM	1	8.118									

11/22/2019	A1	PERLINELLA	DRYMO	1	5.445									
11/22/2019	A2	BAETIS	INTERCALARIS	6	4.851	4.554	3.366	5.049	3.762	0.925				
11/22/2019	A2	EPHEMERELLA	DOROTHEA	2	2.600	2.800								
11/22/2019	A2	MACCAFFERTIUM	MODESTUM	2	3.450	4.150								
11/22/2019	A2	CHEUMATOPSYCHE	SPP.	3	9.306	3.350	3.350							
11/22/2019	R1	EPHEMERELLA	DOROTHEA	5	3.844	3.038	3.286	2.418	2.728					
11/22/2019	R1	MACCAFFERTIUM	MODESTUM	101	7.326	6.336	5.247	6.039	4.158	4.653	5.049	4.950	2.475	3.069
11/22/2019	R1	HYDROPSYCHE	BETTENI	2	11.346	4.392								
11/22/2019	R1	CHIMARRA	SPP.	11	6.633	8.316	8.712	6.138	5.742	5.742	5.346	5.643	8.118	5.346
11/22/2019	R2	BAETIS	INTERCALARIS	3	7.029	4.752	3.861							
11/22/2019	R2	EPHEMERELLA	DOROTHEA	1	2.650									
11/22/2019	R2	MACCAFFERTIUM	MODESTUM	17	5.146	4.216	4.092	3.596	5.332	6.930	8.019	6.138	6.534	7.524
11/22/2019	R2	CHEUMATOPSYCHE	SPP.	5	11.956	8.316	7.524	6.039	3.762					
11/22/2019	R2	HYDROPSYCHE	BETTENI	3	8.514	8.118	14.396							
11/22/2019	R2	CHIMARRA	SPP.	1	4.700									
2/14/2020	A1	MACCAFFERTIUM	MODESTUM	32	9.207	9.801	11.102	13.542	9.272	9.882	6.831	7.326	8.415	5.940
2/14/2020	A1	CHEUMATOPSYCHE	SPP.	5	6.448	10.248	11.468	10.858	11.468					
2/14/2020	A1	HYDROPSYCHE	BETTENI	1	11.468									
2/14/2020	A1	CHIMARRA	SPP.	2	9.516	10.004								

2/14/2020	A2	BAETIS	SPP.	5	5.451	5.530	4.092	5.704	5.214					
2/14/2020	A2	MACCAFFERTIUM	MODESTUM	10	11.590	9.882	9.882	12.078	9.028	10.248	12.444	6.344	11.468	5.841
2/14/2020	A2	CHEUMATOPSYCHE	SPP.	3	9.150	5.124	5.612							
2/14/2020	A2	HYDROPSYCHE	BETTENI	4	14.396	14.152	11.102	14.152						
2/14/2020	A3	DANNELLA	SIMPLEX	1	3.782									
2/14/2020	A4	MACCAFFERTIUM	MODESTUM	1	6.004									
2/14/2020	C1	BAETIS	SPP.	1	11.956									
2/14/2020	C1	DANNELLA	SIMPLEX	3	3.538	7.442	7.320							
2/14/2020	C1	MACCAFFERTIUM	MODESTUM	4	10.004	6.954	5.368	3.538						
2/14/2020	C1	ECCOPTURA	XANTHENES	3	13.664	11.712	9.272							
2/14/2020	C1	CHEUMATOPSYCHE	SPP.	2	10.248	6.832								
2/14/2020	C1	DIPLECTRONA	MODESTA	1	15.982									
2/14/2020	C1	HYDROPSYCHE	BETTENI	3	16.348	15.006	11.468							
2/14/2020	C1	LEPIDOSTOMA	SPP.	14	5.084	5.022	5.456	5.828	4.216	4.836	4.464	5.208	5.146	5.022
2/14/2020	C2	EPHEMERELLA	DOROTHEA	16	7.227	7.029	8.811	6.138	7.029	7.326	7.326	6.237	6.633	6.732
2/14/2020	C2	MACCAFFERTIUM	MODESTUM	23	10.614	9.638	11.834	15.372	9.028	8.052	6.466	6.954	9.882	4.392
2/14/2020	C2	CHEUMATOPSYCHE	SPP.	8	13.298	10.248	11.468	13.176	10.248	6.952	6.162	7.189		
2/14/2020	C2	HYDROPSYCHE	BETTENI	1	10.858									
2/14/2020	C2	LEPIDOSTOMA	SPP.	4	29.036	19.886	17.324	5.368						

2/14/2020	D1	DANNELLA	SIMPLEX	1	3.050										
2/14/2020	D1	MACCAFFERTIUM	MODESTUM	1	8.662										
2/14/2020	D1	CHEUMATOPSYCHE	SPP.	1	9.306										
2/14/2020	D2	CHEUMATOPSYCHE	SPP.	6	11.102	10.858	7.524	10.492	6.588	6.344					
2/14/2020	R1	BAETIS	SPP.	11	5.766	4.092	6.636	5.394	4.898	5.518	3.782	3.968	4.278	4.092	
2/14/2020	R1	DANNELLA	SIMPLEX	2	3.038	3.596									
2/14/2020	R1	MACCAFFERTIUM	MODESTUM	146	5.612	11.590	9.638	11.956	7.442	7.320	8.662	6.588	8.296	5.978	
2/14/2020	R1	CHEUMATOPSYCHE	SPP.	9	9.516	3.904	7.076	8.784	11.224	9.516	5.332	8.118	5.225		
2/14/2020	R1	HYDROPSYCHE	BETTENI	3	11.956	7.524	4.836								
2/14/2020	R1	CHIMARRA	SPP.	20	9.516	10.858	9.028	9.638	6.832	8.906	9.272	6.222	6.004	4.819	
2/14/2020	R2	MACCAFFERTIUM	MODESTUM	61	9.108	10.492	7.920	11.346	12.200	9.306	8.910	6.831	8.316	6.138	
2/14/2020	R2	CHEUMATOPSYCHE	SPP.	19	10.492	9.882	9.638	10.248	9.272	10.614	7.808	7.564	7.686	5.978	
2/14/2020	R2	HYDROPSYCHE	BETTENI	7	11.224	9.272	10.492	7.584	16.592	5.208	6.076				
2/14/2020	R2	CHIMARRA	SPP.	21	5.372	8.316	8.514	9.405	9.306	8.118	7.128	8.712	8.118	4.600	
2/14/2020	P1	CHEUMATOPSYCHE	SPP.	2	7.686	5.952									
7/28/2020	A1	DANNELLA	SIMPLEX	35	3.050	4.400	5.332	4.100	3.650	3.350	3.600	3.100	3.600	3.150	
7/28/2020	A1	MACCAFFERTIUM	MODESTUM	27	3.844	3.968									
7/28/2020	A2	MACCAFFERTIUM	MODESTUM	1	4.582										

7/28/2020	A2	CHEUMATOPSYCHE	SPP.	1	7.442									
7/28/2020	A2	HYDROPSYCHE	BETTENI	1	13.176									
7/28/2020	A3			1	3.081									
7/28/2020	A3	CHEUMATOPSYCHE	SPP.	6	8.514	7.326	6.336	5.346	8.118	5.544				
7/28/2020	A3	HYDROPSYCHE	BETTENI	3	3.844	4.216								
7/28/2020	A4	EPHEMERELLA	DOROTHEA	1	3.782									
7/28/2020	C1	MACCAFFERTIUM	MODESTUM	3	7.564	6.954	5.368							
7/28/2020	C1	ECCOPTURA	XANTHENES	17	6.138	9.405	6.831	5.841	5.346	5.742	4.851	5.544	5.148	5.148
7/28/2020	C1	CHEUMATOPSYCHE	SPP.	2	9.150	9.394								
7/28/2020	C1	LEPIDOSTOMA	SPP.	3	9.516	9.272	10.248							
7/28/2020	C2	MACCAFFERTIUM	MODESTUM	7	8.811	7.722	7.623	6.732	5.643	8.217				
7/28/2020	C2	ALLOPERLA	SPP.	3	3.160	3.002	3.318							
7/28/2020	C2	ECCOPTURA	XANTHENES	11	4.356	5.445	6.534	5.544	5.049	4.455	4.653	4.356	4.059	3.861
7/28/2020	C2	PERLINELLA	EPHYRE	4	3.782	3.968	3.410	3.286						
7/28/2020	C2	CHEUMATOPSYCHE	SPP.	6	6.534	7.722	8.316	9.516	10.248	10.248				
7/28/2020	C2	HYDROPSYCHE	BETTENI	5	11.468	7.326	4.740	4.836	4.464					
7/28/2020	C2	PYCNOPSYCHE	SCABRIPENNIS	11	8.784	7.808	6.831	6.930	8.712	7.425	5.940	5.544	7.722	19.032
7/28/2020	D1	BAETIS	SPP.	1	4.464									
7/28/2020	D1	DANNELLA	SIMPLEX	2	3.792	4.582								

7/28/2020	D1	MACCAFFERTIUM	MODESTUM	5	5.841	8.019	4.050	2.900	2.800					
7/28/2020	D1	CHEUMATOPSYCHE	SPP.	2	4.464	5.828								
7/28/2020	D2	BAETIS	SPP.	2	6.715	5.451								
7/28/2020	D2	MACCAFFERTIUM	MODESTUM	1	6.399									
7/28/2020	D2	CHEUMATOPSYCHE	SPP.	3	8.540	8.662	3.300							
7/28/2020	D2	HYDROPSYCHE	BETTENI	7	13.176	15.250	16.104	11.834	10.858	9.322	3.968			
7/28/2020	R1	DANNELLA	SIMPLEX	4	3.224	3.906	4.030	3.782						
7/28/2020	R1	MACCAFFERTIUM	MODESTUM	31	8.052	5.049	5.445	6.831	5.148	6.237	4.554	4.455	4.554	4.653
7/28/2020	R1	CHIMARRA	SPP.	1	9.516									
7/28/2020	R1	HYDROPSYCHE	BETTENI	1	9.638									
7/28/2020	R1	CHEUMATOPSYCHE	SPP.	4	9.504	4.898	5.293	7.347						
7/28/2020	R2	MACCAFFERTIUM	MODESTUM	27	6.732	5.742	5.544	5.841	5.247	5.148	4.455	4.158	3.168	4.752
7/28/2020	R2	CHEUMATOPSYCHE	SPP.	2	9.028	5.828								
7/28/2020	P1	MACCAFFERTIUM	MODESTUM	3	7.426	5.846								
7/28/2020	P1	CHEUMATOPSYCHE	SPP.	5	7.821	4.100	2.950							
7/28/2020	P1	HYDROPSYCHE	BETTENI	3	6.399	7.426	3.968							

Appendix B5. Biomass values for the EPT taxa across all sites from 2016-2020. The symbol '#' represents the species count for the respective date and site. The symbol 'B' represents the biomass. **Note highlighted cells represent species that were not able to be measured due to damage.*

DATE	SITE	GENUS	#	B 1	B 2	B 3	B 4	B 5	B 6	B 7	B 8	B 9	B 10
7/28/2016	A1	MACCAFFERTIUM	3	0.548	0.822								
7/28/2016	A1	STENONEMA	2	0.435									
7/28/2016	A1	LEPIDOSTOMA	2	1.962									
7/28/2016	A1	IRONOQUIA	1	0.800									
7/28/2016	A2	HABROPHLEBIA	3	0.070	0.035								
7/28/2016	A2	PERLINELLA	2	1.856	0.502								
7/28/2016	A2	GOERA	1	1.750									
7/28/2016	A2	CHEUMATOPSYCHE	8	2.925	6.072	1.777	3.780	0.537	0.752	0.365	1.329		
7/28/2016	A2	LEPIDOSTOMA	15	3.338	2.380	4.697	3.696	5.257					
7/28/2016	A2	OLIGOSTOMIS	2	0.000									
7/28/2016	A3	STENONEMA	1	2.281									
7/28/2016	A3	HABROPHLEBIA	1	0.098									
7/28/2016	A3	ALLOPERLA	1	0.000									
7/28/2016	A3	PERLINELLA	4	0.798	0.715	1.637							
7/28/2016	A3	HYDROPSYCHE	1	0.857									
7/28/2016	A3	LEPIDOSTOMA	3	0.000									
7/28/2016	A3	OLIGOSTOMIS	2	1.879									
7/28/2016	A4	LEPIDOSTOMA	1	0.000									
7/28/2016	R1	BAETIS	3	0.352	0.330								
7/28/2016	R1	MACCAFFERTIUM	3	0.963	2.293								
7/28/2016	R1	STENONEMA	2	0.815	1.564								
7/28/2016	R1	PTILOSTOMIS	2	3.744	3.870								
7/28/2016	R2	BAETIS	2	0.269									
7/28/2016	R2	MACCAFFERTIUM	2	1.287	0.209								
7/28/2016	R2	CHEUMATOPSYCHE	4	3.908	4.231	3.781	0.279						
7/28/2016	R2	DIPLECTRONA	3	2.926	3.282	0.749							

7/28/2016	P1	CHIMARRA	1	0.000										
7/28/2016	C1	BAETIS	1	0.000										
7/28/2016	C1	PERLINELLA	2	1.195	0.231									
7/28/2016	C1	DIPLECTRONA	1	1.715										
7/28/2016	C1	HYDROPSYCHE	5	0.000										
7/28/2016	C1	LEPIDOSTOMA	1	0.000										
7/28/2016	C2	MACCAFFERTIU M	1	5.594										
7/28/2016	C2	PERLINELLA	2	1.090	0.647									
7/28/2016	C2	HYDROPSYCHE	2	5.314	3.289									
7/28/2016	C2	LEPIDOSTOMA	1	0.000										
7/28/2016	C2	NEOPHYLAX	9	0.000										
11/14/201 6	A1	MACCAFFERTIU M	1	1.064										
11/14/201 6	A1	ALLOCAPNIA	36	0.259	0.826	0.744	0.826	0.744	0.78 5	0.870	0.38 3	0.26 5	0.467	
11/14/201 6	A2	EURYLOPHELLA	1	0.403										
11/14/201 6	A2	MACCAFFERTIU M	4	0.583	0.324	0.180	1.402							
11/14/201 6	A2	ALLOCAPNIA	53	0.183	0.593	0.724	0.359	0.341	0.30 7	0.137	0.19 2	0.41 5	0.569	
11/14/201 6	A2	ECCOPTURA	1	1.872										
11/14/201 6	A2	PERLINELLA	1	1.373										
11/14/201 6	A2	CHEUMATOPSYC HE	1	0.415										
11/14/201 6	A2	HYDROPSYCHE	2	5.314	2.267									
11/14/201 6	A3	ALLOCAPNIA	6	0.203	0.494	0.249	0.325	0.066						
11/14/201 6	A4	ALLOCAPNIA	3	0.055	0.038									
11/14/201 6	R1	MACCAFFERTIU M	3	2.126	2.468	1.117								
11/14/201 6	R1	ALLOCAPNIA	7	0.193										
11/14/201 6	R1	HYDROPSYCHE	3	5.796	0.941	2.178								
11/14/201 6	R2	PERLINELLA	1	1.025										
11/14/201 6	R2	PERLINELLA	1	1.637										

11/14/2016	R2	HYDROPSYCHE	3	0.710	0.305	0.467							
11/16/2016	C2	EURYLOPHELLA	1	0.356									
11/16/2016	C2	MACCAFFERTIUM	1	4.304									
11/16/2016	C2	ALLOCAPNIA	6	0.034	0.857	0.074	0.132	0.110					
11/16/2016	C2	PERLINELLA	2	2.353	1.033								
11/16/2016	C2	PERLINELLA	1	3.977									
11/16/2016	C2	DIPLECTRONA	2	0.000									
11/16/2016	C2	HYDROPSYCHE	6	2.693	0.127	0.499	3.007	0.158	0.137				
11/16/2016	C2	PYCNOPSYCHE	1	0.000									
3/17/2017	A1	BAETIS	9	5.550	0.676	0.580	0.611	0.857	0.521	0.494			
3/17/2017	A1	BAETIS	294	0.288	0.449	0.625	0.562	0.308	0.269	0.399	0.269	0.352	0.269
3/17/2017	A1	EPHEMERELLA	74	2.243	1.340	1.340	0.969	1.183	1.260	1.423	1.300	1.003	1.109
3/17/2017	A1	MACCAFFERTIUM	2	2.126	2.231	0.369							
3/17/2017	A1	ALLOPERLA	28	0.440	0.250	0.838	1.047	0.625	0.625	0.562	0.533	0.352	0.504
3/17/2017	A1	APHINEMURA	21	0.876	0.963	0.583	0.822	1.347	1.604	0.393	0.779	1.172	1.537
3/17/2017	A1	ISOPERLA	30	3.653	1.739	1.788	0.218	0.127	0.137	0.205	0.246	0.291	0.158
3/17/2017	A1	IRONOQUIA	2	18.723	28.334								
3/17/2017	A1	NEOPHYLAX	1										
3/17/2017	A2	BAETIS	4	0.215									
3/17/2017	A2	EPHEMERELLA	1	3.283									
3/17/2017	A2	MACCAFFERTIUM	1	0.340									
3/17/2017	A2	ALLOPERLA	8	0.374	0.451	0.514	0.583	0.619	0.696				
3/17/2017	A2	APHINEMURA	1	0.344									
3/17/2017	A2	LEPIDOSTOMA	3	1.234	6.785	21.751							
3/17/2017	A2	NEOPHYLAX	20	2.613	1.478								

3/17/2017	A3	BAETIS	4	0.800	2.843	6.169	11.262						
3/17/2017	A3	EPHEMERELLA	4	2.820	0.724	0.275	0.969						
3/17/2017	A3	MACCAFFERTIUM	1	0.340									
3/17/2017	A3	ALLOPERLA	8	0.245	0.374	0.138	0.374	0.187	0.127	0.107	0.215		
3/17/2017	A3	APHINEMURA	3	0.515	0.388	0.283							
3/17/2017	A3	DIPLOPERLA	1	0.110									
3/17/2017	A3	LEPIDOSTOMA	1	7.674									
3/17/2017	A3	NEOPHYLAX	15	2.785									
3/17/2017	A4	BAETIS	3	0.288	0.250	0.250							
3/17/2017	A4	EPHEMERELLA	1	2.243									
3/17/2017	A4	ALLOPERLA	1	0.161									
3/17/2017	A4	APHINEMURA	15	0.572	0.494	0.580	0.897	0.611	0.676	0.521	0.550	0.467	0.144
3/17/2017	A4	ISOPERLA	5	0.150	0.107	0.140	0.178	0.079					
3/17/2017	A4	CHEUMATOPSYCHE	1	2.178									
3/17/2017	A4	HYDROPSYCHE	1	7.804									
3/17/2017	A4	NEOPHYLAX	20	1.478	1.172	1.891	1.408	3.252					
3/17/2017	C1	EPHEMERELLA	1	0.108									
3/17/2017	C1	MACCAFFERTIUM	2	10.691	4.388								
3/17/2017	C1	PERLINELLA	2	0.073	0.065								
3/17/2017	C1	ANISOCENTROPUS	1	64.579									
3/17/2017	C1	NEOPHYLAX	29	1.750	2.371	1.062							
3/17/2017	C2	BAETIS	1										
3/17/2017	C2	DANNELLA	2	0.011	0.011								
3/17/2017	C2	EPHEMERELLA	2	1.066	0.209								
3/17/2017	C2	MACCAFFERTIUM	2	3.359	2.746								
3/17/2017	C2	ALLOPERLA	1	0.743									
3/17/2017	C2	PERLINELLA	2	0.044									
3/17/2017	C2	APHINEMURA	1	0.487									
3/17/2017	C2	CHEUMATOPSYCHE	2	0.415	3.908								
3/17/2017	C2	LEPIDOSTOMA	1	0.168									
3/17/2017	C2	NEOPHYLAX	37	1.660	1.789								

3/17/2017	D2	MACCAFFERTIUM	2	1.673	3.252								
3/17/2017	D2	LEPIDOSTOMA	1	0.847									
3/17/2017	D2	NEOPHYLAX	10	0.000									
3/17/2017	R1	BAETIS	16	7.080	0.266	0.282	0.299	0.133	0.179	0.103	0.220	0.094	0.086
3/17/2017	R1	EPHEMERELLA	2	1.812	1.681								
3/17/2017	R1	MACCAFFERTIUM	1	9.346									
3/17/2017	R1	PERLINELLA	1	6.256									
3/17/2017	R1	APHINEMURA	1	0.731									
3/17/2017	R1	NEOPHYLAX	3	1.106									
3/17/2017	R2	BAETIS	2	0.625	0.232								
3/17/2017	R2	EPHEMERELLA	5	3.381	2.574	1.735	2.271	2.345					
3/17/2017	R2	MACCAFFERTIUM	4	6.992	4.629	3.916	1.107						
3/17/2017	R2	CHEUMATOPSYCHE	1	2.764									
3/17/2017	P1	MACCAFFERTIUM	1	3.582									
6/20/2017	A1	IRONOQUIA	1	1.356									
6/20/2017	A3	MACCAFFERTIUM	1	2.843									
6/20/2017	A3	PERLINELLA	1	1.373									
6/20/2017	A3	CHEUMATOPSYCHE	1	2.610									
6/20/2017	A3	HYDROPSYCHE	1	3.405									
6/20/2017	A3	NEOPHYLAX	21										
6/20/2017	A4	HYDROPSYCHE	1	2.776									
6/20/2017	A4	NEOPHYLAX	26										
6/20/2017	R1	MACCAFFERTIUM	1	0.868									
6/20/2017	R1	CHEUMATOPSYCHE	2	0.085	1.109								
6/20/2017	R1	HYDROPSYCHE	1	2.860									
6/20/2017	R2	HYDROPSYCHE	3	4.712	0.026	0.082							
6/20/2017	P1	MACCAFFERTIUM	5	2.651	1.117	0.696	1.013	0.482					
6/20/2017	P1	CHEUMATOPSYCHE	18	3.262	1.221	1.739	0.499	0.180	0.569	0.593	0.307	0.218	0.644
6/20/2017	P1	HYDROPSYCHE	1	5.963									

6/20/2017	P1	OLIGOSTOMIS	1										
6/20/2017	P1	NEOPHYLAX	3										
6/21/2017	C2	MACCAFFERTIUM	12	2.558	2.987	2.654	1.003	0.562	0.625	0.215	0.155	0.184	
6/21/2017	C2	PERLINELLA	3	0.270	0.165	0.102							
6/21/2017	C2	DIPLECTRONA	30	5.134	3.254	3.631	2.987	2.199	1.674	0.699	3.735	1.275	0.934
6/21/2017	C2	PSILOTRETA	3	0.265	0.098	0.147							
6/21/2017	C2	NEOPHYLAX	18	0.207									
6/21/2017	D1	BAETIS	1	0.130									
6/21/2017	D1	MACCAFFERTIUM	1	0.209									
6/21/2017	D1	HYDROPSYCHE	18	1.359	0.618	1.599	0.781	0.841	0.324	0.180	0.275	0.260	0.092
6/21/2017	D1	NEOPHYLAX	1										
6/21/2017	D2	MACCAFFERTIUM	6	1.817	2.046	1.817	0.737	1.064	0.366				
6/21/2017	D2	CHEUMATOPSYCHE	7	1.183	2.353	3.147	2.095	0.567	0.887	0.983			
6/21/2017	D2	HYDROPSYCHE	5	0.144	1.381	0.811	1.692	1.837					
6/21/2017	D2	NEOPHYLAX	1										
10/18/2017	A1	BAETIS	3	0.199	0.352								
10/18/2017	A1	MACCAFFERTIUM	7	1.537	0.451								
10/18/2017	A1	CHEUMATOPSYCHE	4	0.936	0.979	1.953	1.467						
10/18/2017	A2	MACCAFFERTIUM	9	0.868	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
10/18/2017	A3	NEOPHYLAX	6										
10/18/2017	A4	DIPLECTRONA	1	3.371									
10/18/2017	A4	NEOPHYLAX	11										
10/18/2017	R1	MACCAFFERTIUM	4	0.315	2.209	0.548	0.340						
10/18/2017	R2	BAETIS	9	0.625	0.275	0.137	0.456	0.246	0.180	0.169	0.260	0.359	
10/18/2017	R2	MACCAFFERTIUM	14	1.347	1.338	0.504	0.399	0.288	0.562	0.250	0.449	0.375	0.625
10/18/2017	R2	CHEUMATOPSYCHE	23	0.936	2.209	12.153	8.594	4.549	4.882	10.691	1.968	1.287	0.657
10/18/2017	R2	CHIMARRA	3	0.407	0.149								

10/19/2017	C2	MACCAFFERTIUM	2	4.697									
10/19/2017	C2	PERLINELLA	1	1.436									
10/19/2017	C2	DIPLECTRONA	2	2.212	0.910								
10/19/2017	C2	LEPIDOSTOMA	2	0.606	0.246								
10/19/2017	D1	MACCAFFERTIUM	2	1.229	0.868								
10/19/2017	D1	CHEUMATOPSYCHE	10	0.359	0.477	0.415	1.887	0.811	1.183	0.232	0.127	3.007	3.007
10/19/2017	D2	CHIMARRA	1	0.496									
10/19/2017	D2	NEOPHYLAX	3										
2/18/2018	A1	EPHEMERELLA	2	4.119	2.167								
2/18/2018	A1	MACCAFFERTIUM	2	5.230	4.549								
2/18/2018	A1	CHEUMATOPSYCHE	1	2.317									
2/18/2018	A1	LEPIDOSTOMA	1	0.129									
2/18/2018	A3	EPHEMERELLA	23	4.119	0.670	1.109	0.377	0.522	1.073	0.169	0.753	0.275	0.127
2/18/2018	A3	MACCAFFERTIUM	2	0.604	7.208								
2/18/2018	A3	LEPIDOSTOMA	1	0.118									
2/18/2018	A3	PYCNOPSYCHE	1	0.392									
2/18/2018	A3	CHIMARRA	5	1.619	3.495	1.275	0.934	1.760					
2/18/2018	A3	NEOPHYLAX	2	0.797	0.846								
2/18/2018	A4	IRONOQUIA	1	0.232									
2/18/2018	A4	NEOPHYLAX	10										
2/18/2018	C2	DANNELLA	4	1.501									
2/18/2018	C2	MACCAFFERTIUM	10	4.304									
2/18/2018	C2	ECCOPTURA	2	11.395	43.566								
2/18/2018	C2	ANISOCENTROPUS	1	10.616									
2/18/2018	C2	DIPLECTRONA	3	11.297	5.320	0.164							
2/18/2018	C2	LEPIDOSTOMA	9	0.182	0.132	0.325	0.091	0.059	0.132	0.046	0.046		
2/18/2018	C2	PYCNOPSYCHE	3	1.495	2.693	4.247							

2/18/2018	C2	RHYACOPHILA	2	5.268	6.484								
2/18/2018	R1	MACCAFFERTIUM	6	0.914	2.496	0.476	0.449	0.169	0.232				
2/18/2018	R2	EPHEMERELLA	1	0.459									
2/18/2018	R2	MACCAFFERTIUM	7	1.117	1.229	0.393	4.564	2.126	0.583	0.914			
2/18/2018	R2	CHEUMATOPSYCHE	2	4.737	4.106								
2/18/2018	R2	DIPLECTRONA	1	5.320									
2/18/2018	R2	LEPIDOSTOMA	1	0.099									
2/18/2018	P1	BAETIS	1	0.449									
2/18/2018	P1	MACCAFFERTIUM	3	1.817	1.013	0.868							
2/18/2018	P1	DIPLECTRONA	2	8.738	6.026								
2/18/2018	P1	PYCNOPSYCHE	4	1.915	0.214	0.392	69.802						
8/16/2018	C1	BAETIS	1	0.352									
8/16/2018	C1	DIPLECTRONA	3	8.505	3.282								
8/16/2018	C2	DANNELLA	2	0.225	0.190								
8/16/2018	C2	MACCAFFERTIUM	3	0.914	1.287	0.269							
8/16/2018	C2	CHEUMATOPSYCHE	1	2.317									
8/16/2018	C2	LEPIDOSTOMA	3	0.344	1.436	0.182							
8/16/2018	C2	PYCNOPSYCHE	2	11.813									
8/16/2018	C2	CHIMARRA	1	0.596									
8/16/2018	C2	NEOPHYLAX	13	1.365									
8/16/2018	D1	PLAUDITUS	8	1.415	0.308	0.269	0.288	0.352	0.918	0.593	1.236	0.800	0.352
8/16/2018	D1	PERLINELLA	1	0.715									
8/16/2018	D1	CHEUMATOPSYCHE	8	1.599	0.569	0.936	1.260	1.423	1.599	0.477	0.291		
8/17/2018	A3	BAETIS	10	1.445									
8/17/2018	A4	BAETIS	2	0.625									
8/17/2018	R1	BAETIS	2	0.232									
8/17/2018	R1	CHEUMATOPSYCHE	1	0.904									
8/17/2018	R2	BAETIS	2	1.286	1.187								
8/17/2018	R2	MACCAFFERTIUM	1	0.482									

8/17/2018	R2	CHEUMATOPSYCHE	3	0.359	0.618	1.145							
11/8/2018	A1	BAETIS	2	1.286	0.476								
11/8/2018	A1	CHEUMATOPSYCHE	20	2.925	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
11/8/2018	A1	DIPLECTRONA	2	0.684	1.373								
11/8/2018	A1	CHIMARRA	1	0.882									
11/8/2018	A2	BAETIS	1	0.692									
11/8/2018	A2	DIPLECTRONA	6	2.535	3.346	0.967	0.365	0.161	0.073				
11/8/2018	A3	CHEUMATOPSYCHE	1	0.697									
11/8/2018	A3	HYDROPSYCHE	1	0.325									
11/8/2018	A4	BAETIS	6	0.533	0.198	0.679	0.266						
11/8/2018	A4	MACCAFFERTIUM	1	0.737									
11/8/2018	A4	CHEUMATOPSYCHE	4	1.145	3.043	0.514	0.868						
11/8/2018	A4	HYDROPSYCHE	2	0.325	0.285								
11/8/2018	C1	BAETIS	18	0.692	1.891	0.737	0.914	1.408	0.868	0.963	1.408	0.696	1.744
11/8/2018	C1	DANNELLA	1	0.010									
11/8/2018	C1	MACCAFFERTIUM	25	15.093	2.493	0.242	0.400	0.842	1.677	1.002	1.523	0.700	3.282
11/8/2018	C1	CHEUMATOPSYCHE	33	0.936	1.715	1.489	2.749	2.910	2.749	0.670	4.379	4.510	4.249
11/8/2018	C1	DIPLECTRONA	1	3.968									
11/8/2018	C1	CHIMARRA	1	0.731									
11/8/2018	C2	BAETIS	1	1.139									
11/8/2018	C2	BAETIS	1	0.155									
11/8/2018	C2	DANNELLA	1	0.357									
11/8/2018	C2	MACCAFFERTIUM	7	2.293									
11/8/2018	C2	ALLOPERLA	10	0.296									
11/8/2018	C2	PERLINELLA	4	2.444									
11/8/2018	C2	DIPLECTRONA	12	3.171									
11/8/2018	C2	RHYACOPHILA	2	2.501									
11/8/2018	D1	MACCAFFERTIUM	2	2.126									
11/8/2018	D1	CHEUMATOPSYCHE	162	1.917									
11/8/2018	D2	HYDROPSYCHE	2	8.848									

11/8/2018	D2	CHEUMATOPSYCHE	162	2.534									
11/8/2018	P1	CHEUMATOPSYCHE	6	0.477									
2/25/2019	C1	BAETIS	4	0.658	0.079	0.067	0.086						
2/25/2019	C1	EPHEMERELLA	23	3.400	3.363	3.101	2.395	1.892	1.626	1.036	1.100	5.410	4.882
2/25/2019	C1	MACCAFFERTIUM	7	0.737	2.444	4.183	5.243	3.010	4.519	25.106			
2/25/2019	C1	ALLOPERLA	1	0.130									
2/25/2019	C1	PERLINELLA	1	2.084									
2/25/2019	C1	APHINEMURA	1	0.129									
2/25/2019	C1	HYDROPSYCHE	9	6.661	2.178	4.006	2.045	2.178	0.825	0.354	0.450	0.038	
2/25/2019	C2	EPHEMERELLA	19	3.780	0.801	0.965	1.227	0.373	0.865	0.897	0.575	0.456	0.711
2/25/2019	C2	MACCAFFERTIUM	6	4.882	0.000	0.000	0.000	0.000	0.000				
2/25/2019	C2	ALLOPERLA	10	0.142	0.443	0.089	0.181	0.305	0.173	0.215	0.070	0.252	0.079
2/25/2019	C2	DIPLECTRONA	1	1.651									
2/25/2019	C2	HYDROPSYCHE	1	7.606	0.825	0.983	1.794	0.450	0.237	0.620			
2/25/2019	C2	PYCNOPSYCHE	1	0.283									
2/25/2019	C2	NEOPHYLAX	10	2.782									
2/25/2019	D1	MACCAFFERTIUM	1	3.499									
2/25/2019	D1	CHEUMATOPSYCHE	42	1.855	4.379	4.510	5.351	2.406	6.785	5.651	1.165	3.524	4.780
2/25/2019	D2	CHEUMATOPSYCHE	42	3.175	3.720	4.821	4.247	3.473	0.755	1.056	0.449	0.848	0.238
2/25/2019	D2	HYDROPSYCHE	4	3.405	1.481	3.653	0.502						
2/25/2019	P1	CHEUMATOPSYCHE	3	2.925	1.915	1.750							
2/26/2019	A1	CHEUMATOPSYCHE	2	2.247	1.563								
2/26/2019	A1	HYDROPSYCHE	2	7.804	10.946								
2/26/2019	A1	NEOPHYLAX	3										
2/26/2019	A2	BAETIS	4	1.404	2.288	2.395	0.604						
2/26/2019	A2	CHEUMATOPSYCHE	10	2.045	2.925	2.247	1.112	1.158	3.262	1.980	1.508	0.652	0.273
2/26/2019	A3	PLAUDITUS	1	1.054									

2/26/2019	A3	MACCAFFERTIUM	1	8.115									
2/26/2019	A3	CHEUMATOPSYCHE	4	2.925	4.829	1.245	1.379						
2/26/2019	A4	BAETIS	11	1.093	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2/26/2019	A4	MACCAFFERTIUM	1	7.653									
2/26/2019	A4	CHEUMATOPSYCHE	5	5.916	4.517	4.246	3.985	14.004					
2/26/2019	R1	BAETIS	2	1.735	1.187								
2/26/2019	R1	EPHEMERELLA	1	6.800									
7/15/2019	C1	BAETIS	2	0.330	0.184								
7/15/2019	C1	PLAUDITUS	3	0.251	0.418	0.183							
7/15/2019	C1	EPHEMERELLA	2	0.650	0.330								
7/15/2019	C1	MACCAFFERTIUM	6	2.209	0.643	0.325	0.643	0.249	0.157				
7/15/2019	C1	ECCOPTURA	9	1.425	1.229	0.737	0.619	0.779	0.914	1.229	1.172	0.315	
7/15/2019	C1	CHEUMATOPSYCHE	18	0.456	1.038	1.692	1.221	0.218	0.275	0.396	0.101	0.205	1.145
7/15/2019	C1	HYDROPSYCHE	68	1.067	0.580	0.416	2.020	0.580	6.661	5.471	5.007	5.314	6.306
7/15/2019	C2	MACCAFFERTIUM	7	0.730	0.657	1.297	0.383	0.164	0.224				
7/15/2019	C2	PERLINELLA	7	0.270	0.468	0.148	1.478	0.241	0.967	0.688			
7/15/2019	C2	CHEUMATOPSYCHE	4										
7/15/2019	C2	DIPLECTRONA	1	4.518									
7/15/2019	C2	HYDROPSYCHE	2	7.029	0.503								
7/15/2019	C2	LEPIDOSTOMA	1										
7/15/2019	D1	CHEUMATOPSYCHE	29										
7/15/2019	D1	HYDROPSYCHE	10	2.946	1.557	1.047	0.692	0.763	0.475	0.239	0.361	0.339	0.110
7/15/2019	D2	CHEUMATOPSYCHE	25	1.423	5.410	3.638	4.882	0.914	2.558	0.963	0.548	1.408	2.468
7/15/2019	D2	HYDROPSYCHE	5	4.712	5.007	0.941							
7/15/2019	P1	AMELETUS	1										
7/15/2019	P1	CHEUMATOPSYCHE	151	1.423	3.043	0.963	2.468	4.054	1.172	1.817	2.651	3.252	0.619
7/15/2019	P1	HYDROPSYCHE	67	6.661	4.310	4.106	2.925	2.686	3.262	2.045	0.904	0.569	0.307

7/17/2019	A1		1	0.175									
7/17/2019	A1	BAETIS	5	0.286	0.257	0.413	0.173	0.248					
7/17/2019	A1	EPHEMERELLA	1										
7/17/2019	A1	MACCAFFERTIUM	2	2.126	0.514								
7/17/2019	A1	CHEUMATOPSYCHE	86	1.454	2.469	3.004	2.782	0.897	1.750	2.571	2.274	2.891	3.358
7/17/2019	A1	HYDROPSYCHE	30	0.550	0.838	0.692	1.500	2.833	4.380	5.550	8.034	7.080	1.286
7/17/2019	A2	MACCAFFERTIUM	1	0.300									
7/17/2019	A2	CHEUMATOPSYCHE	36	0.841	2.595	0.629	1.984	1.633	1.862	2.176	0.466	0.395	0.517
7/17/2019	A2	HYDROPSYCHE	11	8.006	6.922	13.350	9.492	0.399	0.441	0.085	0.730	0.213	0.116
7/17/2019	A3	BAETIS	22	0.160	0.181	0.236	0.181	0.211	0.219	0.236	0.281	0.211	0.141
7/17/2019	A3	CHEUMATOPSYCHE	63	0.456	0.653	0.587	1.478	1.537	4.144	2.571	2.891	2.090	1.520
7/17/2019	A3	HYDROPSYCHE	106	3.405	5.708	4.656	3.265	8.643	3.735	1.685	1.391	1.093	0.352
7/17/2019	A4	BAETIS	1	0.330									
7/17/2019	A4	MACCAFFERTIUM	7	6.169	5.410	1.800	0.914	1.310	0.856	0.560			
7/17/2019	A4	CHEUMATOPSYCHE	23	1.221	1.073	1.183	1.340	1.423	1.788	0.753	1.340	0.904	0.307
7/17/2019	A4	HYDROPSYCHE	7	4.291	11.554	12.460	10.974	2.395	0.696	0.340			
7/17/2019	R1	BAETIS	4	0.085	0.034	0.098	0.025						
7/17/2019	R1	DANNELLA	3	1.564	1.628	1.831							
7/17/2019	R1	MACCAFFERTIUM	19	4.433	2.444	1.708	0.934	0.983	0.313	0.715	0.361	0.337	0.471
7/17/2019	R1	CHEUMATOPSYCHE	19	1.855	1.038	1.692	1.183	0.192	0.359	0.359	0.158	0.101	0.071
7/17/2019	R2	MACCAFFERTIUM	14	2.942	0.979	0.643	1.467	0.979	0.521	0.369	0.347	0.231	0.199
7/17/2019	R2	CHEUMATOPSYCHE	48	0.618	2.368	2.698	2.290	1.310	0.627	0.692	0.173	0.071	0.555
7/17/2019	R2	HYDROPSYCHE	48	2.020	1.412	2.159	2.548	4.156	2.850	0.369	0.157	0.215	0.132
7/17/2019	R2	CHIMARRA	1										
11/20/2019	C1	MACCAFFERTIUM	2	1.117	1.537								
11/20/2019	C1	CHEUMATOPSYCHE	7	1.402	3.499	4.882	1.712	3.230	1.100	2.504			

11/20/2019	C1	HYDROPSYCHE	7	3.289	2.404	5.836	1.252	0.798	0.414	0.213			
11/20/2019	C2	ALLOPERLA	3	0.092	0.125	0.110							
11/20/2019	C2	CHEUMATOPSYCHE	1	1.038									
11/20/2019	D1	BAETIS	1	0.426									
11/20/2019	D1	MACCAFFERTIUM	3	1.744	0.482	0.174							
11/20/2019	D1	ALLOPERLA	3	0.244	0.395	0.199							
11/20/2019	D1	CHEUMATOPSYCHE	1	1.260									
11/20/2019	D2	BAETIS	5	0.624	0.265	0.439	0.235	0.098					
11/20/2019	D2	CHEUMATOPSYCHE	5	1.381	0.983	0.534	0.983	0.151					
11/20/2019	D2	HYDROPSYCHE	1	6.661									
11/20/2019	D2	CHIMARRA	1	1.081									
11/22/2019	A1	BAETIS	1	0.153									
11/22/2019	A1	DANNELLA	9	0.249	0.164	0.147	0.103	0.192	0.147	0.164	0.212	0.085	
11/22/2019	A1	MACCAFFERTIUM	1	3.043									
11/22/2019	A1	PERLINELLA	1	0.676									
11/22/2019	A2	BAETIS	6	0.533	0.619	0.269	0.822	0.366	0.008				
11/22/2019	A2	EPHEMERELLA	2	0.124	0.151								
11/22/2019	A2	MACCAFFERTIUM	2	0.288	0.479								
11/22/2019	A2	CHEUMATOPSYCHE	3	1.692	0.116	0.116							
11/22/2019	R1	EPHEMERELLA	5	0.350	0.150	0.185	0.082	0.113					
11/22/2019	R1	MACCAFFERTIUM	101	2.293	1.058	0.619	0.923	0.320	0.440	0.555	0.525	0.073	0.135
11/22/2019	R1	HYDROPSYCHE	2	4.858	0.408								
11/22/2019	R1	CHIMARRA	11	0.535	2.732	3.092	1.217	1.019	1.019	0.842	0.973	2.562	0.842
11/22/2019	R2	BAETIS	3	1.445	0.504	0.288							

11/22/2019	R2	EPHEMERELLA	1	0.130										
11/22/2019	R2	MACCAFFERTIUM	17	0.867	0.458	0.423	0.300	0.855	1.717	2.530	1.243	1.468	2.136	
11/22/2019	R2	CHEUMATOPSYCHE	5	3.262	1.260	0.969	0.545	0.158						
11/22/2019	R2	HYDROPSYCHE	3	2.159	1.887	9.516								
11/22/2019	R2	CHIMARRA	1	0.228										
2/14/2020	A1	MACCAFFERTIUM	32	4.304	1.168	1.592	2.609	1.017	1.192	0.476	0.566	0.799	0.336	
2/14/2020	A1	CHEUMATOPSYCHE	5	0.647	3.930	5.303	4.584	5.303						
2/14/2020	A1	HYDROPSYCHE	1	5.007										
2/14/2020	A1	CHIMARRA	2	1.308	1.481									
2/14/2020	A2	BAETIS	5	0.729	0.754	0.285	0.834	0.624						
2/14/2020	A2	MACCAFFERTIUM	10	8.115	4.349	4.349	8.139	3.279	4.872	8.934	1.090	6.922	0.842	
2/14/2020	A2	CHEUMATOPSYCHE	3	1.619	0.354	0.450								
2/14/2020	A2	HYDROPSYCHE	4	9.516	9.067	4.569	9.067							
2/14/2020	A3	DANNELLA	1	0.362										
2/14/2020	A4	MACCAFFERTIUM	1	1.325										
2/14/2020	C1	BAETIS	1	6.034										
2/14/2020	C1	DANNELLA	3	0.303	2.216	2.120								
2/14/2020	C1	MACCAFFERTIUM	4	5.410	1.986	0.974	0.309							
2/14/2020	C1	ECCOPTURA	3	14.038	8.530	4.009								
2/14/2020	C1	CHEUMATOPSYCHE	2	2.178	0.753									
2/14/2020	C1	DIPLECTRONA	1	14.964										
2/14/2020	C1	HYDROPSYCHE	3	13.627	10.699	5.007								
2/14/2020	C1	LEPIDOSTOMA	14	0.587	0.810	1.018	1.221	0.500	0.730	0.586	0.896	0.867	0.810	
2/14/2020	C2	EPHEMERELLA	16	1.880	0.511	0.896	0.365	0.511	0.566	0.566	0.379	0.442	0.459	
2/14/2020	C2	MACCAFFERTIUM	23	6.368	4.022	7.636	17.284	3.279	2.294	1.156	1.451	4.349	0.346	
2/14/2020	C2	CHEUMATOPSYCHE	8	4.310	4.872	6.922	10.680	4.872	1.450	0.995	1.610			

2/14/2020	C2	HYDROPSYCHE	1	4.291									
2/14/2020	C2	LEPIDOSTOMA	4	59.285	23.696	16.051	0.587						
2/14/2020	D1	DANNELLA	1	0.204									
2/14/2020	D1	MACCAFFERTIUM	1	3.638									
2/14/2020	D1	CHEUMATOPSYCHE	1	1.692									
2/14/2020	D2	CHEUMATOPSYCHE	6	2.686	5.559	2.093	5.074	1.469	1.329				
2/14/2020	R1	BAETIS	11	0.848	0.461	1.746	0.987	0.756	1.050	0.371	0.423	0.521	0.461
2/14/2020	R1	DANNELLA	2	0.201	0.316								
2/14/2020	R1	MACCAFFERTIUM	146	1.100	5.022	3.065	5.458	1.533	1.467	2.303	1.106	2.051	0.853
2/14/2020	R1	CHEUMATOPSYCHE	9	1.794	0.373	1.814	3.224	6.184	3.988	0.855	2.614	0.810	
2/14/2020	R1	HYDROPSYCHE	3	5.632	1.523	0.437							
2/14/2020	R1	CHIMARRA	20	1.308	4.883	2.891	3.481	1.311	2.782	3.119	1.005	0.908	0.487
2/14/2020	R2	MACCAFFERTIUM	61	4.178	4.246	1.992	5.241	6.371	3.074	2.735	1.338	2.271	1.003
2/14/2020	R2	CHEUMATOPSYCHE	19	2.317	4.326	4.047	4.765	3.651	5.232	2.310	2.123	2.215	1.134
2/14/2020	R2	HYDROPSYCHE	7	4.712	4.388	6.169	2.523	21.804	0.896	1.370			
2/14/2020	R2	CHIMARRA	21	0.317	1.630	1.738	2.281	2.216	1.526	1.070	1.851	1.526	0.323
2/14/2020	P1	CHEUMATOPSYCHE	2	1.025	0.525								
7/28/2020	A1	DANNELLA	35	0.205	0.563	0.956	0.463	0.336	0.266	0.324	0.214	0.324	0.224
7/28/2020	A1	MACCAFFERTIUM	27	0.372	0.408								
7/28/2020	A2	MACCAFFERTIUM	1	0.445									
7/28/2020	A2	CHEUMATOPSYCHE	1	1.477									
7/28/2020	A2	HYDROPSYCHE	1	3.511									
7/28/2020	A3		1	0.209									
7/28/2020	A3	CHEUMATOPSYCHE	6	1.340	0.006	0.006	0.006	0.006	0.006				
7/28/2020	A3	HYDROPSYCHE	3	0.229	0.005								
7/28/2020	A4	EPHEMERELLA	1	0.335									

7/28/2020	C1	MACCAFFERTIU M	3	2.504	1.986	0.974								
7/28/2020	C1	ECCOPTURA	17	1.057	4.860	1.940	1.238	0.960	1.17 9	0.726	1.06 6	0.86 1	0.861	
7/28/2020	C1	CHEUMATOPSYC HE	2	1.619	1.734									
7/28/2020	C1	LEPIDOSTOMA	3	3.087	2.882	3.757								
7/28/2020	C2	MACCAFFERTIU M	7	3.813	2.013	1.934	1.312	0.756	2.44 4					
7/28/2020	C2	ALLOPERLA	3	0.116	0.114	0.151								
7/28/2020	C2	ECCOPTURA	11	0.349	0.704	1.140	0.738	0.576	0.41 3	0.464	0.39 0	0.32 3	0.283	
7/28/2020	C2	PERLINELLA	4	0.217	0.260	0.170	0.153							
7/28/2020	C2	CHEUMATOPSYC HE	6	0.670	1.775	2.160	3.087	3.757	3.75 7					
7/28/2020	C2	HYDROPSYCHE	5	5.007	1.615	0.500	0.528	0.426						
7/28/2020	C2	PYCNOPSYCHE	11	2.397	2.733	1.891	1.968	3.696	2.38 0	1.287	1.06 4	2.65 1	31.82 0	
7/28/2020	D1	BAETIS	1	0.426										
7/28/2020	D1	DANNELLA	2	0.365	0.390									
7/28/2020	D1	MACCAFFERTIU M	5	1.229	2.060	0.328	0.133	0.121						
7/28/2020	D1	CHEUMATOPSYC HE	2	0.247	0.496									
7/28/2020	D2	BAETIS	2	1.278	0.729									
7/28/2020	D2	MACCAFFERTIU M	1	1.580										
7/28/2020	D2	CHEUMATOPSYC HE	3	1.351	1.402	0.112								
7/28/2020	D2	HYDROPSYCHE	7	7.410	11.61 4	13.44 8	5.870	4.656	3.08 9	0.310				
7/28/2020	R1	DANNELLA	4	0.236	0.240	0.264	0.217							
7/28/2020	R1	MACCAFFERTIU M	31	2.975	0.514	0.641	1.244	0.544	0.95 3	0.380	0.35 6	0.38 0	0.405	
7/28/2020	R1	CHIMARRA	1	1.308										
7/28/2020	R1	HYDROPSYCHE	1	3.064										
7/28/2020	R1	CHEUMATOPSYC HE	4	1.788	0.756	0.937	2.311							
7/28/2020	R2	MACCAFFERTIU M	27	1.817	0.798	0.715	0.842	0.602	0.56 7	0.361	0.29 1	0.12 5	0.442	
7/28/2020	R2	CHEUMATOPSYC HE	2	1.563	0.740									
7/28/2020	P1	MACCAFFERTIU M	3	2.380	1.231									

7/28/2020	P1	CHEUMATOPSYCHE	5	1.073	0.198	0.083							
7/28/2020	P1	HYDROPSYCHE	3	0.964	1.468	0.250							

Appendix B6: Total biomass (mg/m^2) values for all species, sites, and dates. Total biomass was calculated by multiplying the total count of the species in the sample by the average biomass of the measured organisms.

DATE	SITE	GENUS	SPECIES	TOTAL BIOMASS
7/28/2016	RCA1	MACCAFFERTIUM	MODESTUM	13.174
7/28/2016	RCA1	STENONEMA	FEMORATUM	0.811
7/28/2016	RCA1	LEPIDOSTOMA	SPP.	0.629
7/28/2016	RCA1	IRONOQUIA	PUNCTACISSIMA	0.942
7/28/2016	RCA2	HABROPHLEBIA	SPP.	7.410
7/28/2016	RCA2	PERLINELLA	DRYMO	0.209
7/28/2016	RCA2	GOERA	CALCARATA	1.365
7/28/2016	RCA2	CHEUMATOPSYCHE	SPP.	0.351
7/28/2016	RCA2	LEPIDOSTOMA	SPP.	0.335
7/28/2016	RCA3	STENONEMA	FEMORATUM	5.464
7/28/2016	RCA3	HABROPHLEBIA	SPP.	19.768
7/28/2016	RCA3	PERLINELLA	DRYMO	3.353
7/28/2016	RCA3	HYDROPSYCHE	BETTENI	9.726
7/28/2016	RCA3	OLIGOSTOMIS	SPP.	17.619
7/28/2016	RCR1	BAETIS	INTERCALARIS	0.349
7/28/2016	RCR1	MACCAFFERTIUM	MODESTUM	5.888
7/28/2016	RCR1	STENONEMA	FEMORATUM	0.765
7/28/2016	RCR1	PTILOSTOMIS	SPP.	9.117
7/28/2016	RCR2	BAETIS	INTERCALARIS	7.618
7/28/2016	RCR2	MACCAFFERTIUM	MODESTUM	38.647
7/28/2016	RCR2	CHEUMATOPSYCHE	SPP.	0.426
7/28/2016	RCR2	DIPLECTRONA	MODESTA	0.970
7/28/2016	RCC1	PERLINELLA	DRYMO	4.959
7/28/2016	RCC1	DIPLECTRONA	MODESTA	0.743
7/28/2016	RCC2	MACCAFFERTIUM	MODESTUM	2.007
7/28/2016	RCC2	PERLINELLA	DRYMO	1.580
7/28/2016	RCC2	HYDROPSYCHE	BETTENI	2.865
11/14/2016	RCA1	MACCAFFERTIUM	MODESTUM	44.469
11/14/2016	RCA1	ALLOCAPNIA	SPP.	1.422
11/14/2016	RCA2	EURYLOPHELLA	DORIS	35.704
11/14/2016	RCA2	MACCAFFERTIUM	MODESTUM	1.308
11/14/2016	RCA2	ALLOCAPNIA	SPP.	3.064
11/14/2016	RCA2	ECCOPTURA	XANTHENES	3.399
11/14/2016	RCA2	PERLINELLA	DRYMO	24.437
11/14/2016	RCA2	CHEUMATOPSYCHE	SPP.	2.059
11/14/2016	RCA2	HYDROPSYCHE	BETTENI	5.418
11/14/2016	RCA3	ALLOCAPNIA	SPP.	2.256

11/14/2016	RCA4	ALLOCAPNIA	SPP.	2.681
11/14/2016	RCR1	MACCAFFERTIUM	MODESTUM	152.107
11/14/2016	RCR1	ALLOCAPNIA	SPP.	11.208
11/14/2016	RCR1	HYDROPSYCHE	BETTENI	5.007
11/14/2016	RCR2	PERLINELLA	DRYMO	2.790
11/14/2016	RCR2	PERLINELLA	EPHYRE	3.294
11/14/2016	RCR2	HYDROPSYCHE	BETTENI	58.048
11/16/2016	RCC2	EURYLOPHELLA	DORIS	2.422
11/16/2016	RCC2	MACCAFFERTIUM	MODESTUM	32.219
11/16/2016	RCC2	ALLOCAPNIA	SPP.	0.362
11/16/2016	RCC2	PERLINELLA	DRYMO	1.325
11/16/2016	RCC2	PERLINELLA	EPHYRE	6.034
11/16/2016	RCC2	HYDROPSYCHE	BETTENI	4.638
3/17/2017	RCA1	BAETIS	INTERCALARIS	8.679
3/17/2017	RCA1	BAETIS	SPP.	26.577
3/17/2017	RCA1	EPHEMERELLA	DOROTHEA	2.931
3/17/2017	RCA1	MACCAFFERTIUM	MODESTUM	14.964
3/17/2017	RCA1	ALLOPERLA	SPP.	29.333
3/17/2017	RCA1	APHINEMURA	SPP.	8.106
3/17/2017	RCA1	ISOPERLA	TRANSMARINA	28.796
3/17/2017	RCA1	IRONOQUIA	PUNCTACISSIMA	124.123
3/17/2017	RCA2	BAETIS	INTERCALARIS	18.021
3/17/2017	RCA2	EPHEMERELLA	DOROTHEA	4.291
3/17/2017	RCA2	MACCAFFERTIUM	MODESTUM	96.808
3/17/2017	RCA2	ALLOPERLA	SPP.	0.204
3/17/2017	RCA2	APHINEMURA	SPP.	3.638
3/17/2017	RCA2	LEPIDOSTOMA	SPP.	1.692
3/17/2017	RCA2	NEOPHYLAX	OLIGIUS	9.811
3/17/2017	RCA3	BAETIS	INTERCALARIS	6.303
3/17/2017	RCA3	EPHEMERELLA	DOROTHEA	0.518
3/17/2017	RCA3	MACCAFFERTIUM	MODESTUM	547.636
3/17/2017	RCA3	ALLOPERLA	SPP.	10.754
3/17/2017	RCA3	APHINEMURA	SPP.	7.592
3/17/2017	RCA3	DIPLOPERLA	DUPLICATA	19.301
3/17/2017	RCA3	LEPIDOSTOMA	SPP.	275.134
3/17/2017	RCA3	NEOPHYLAX	OLIGIUS	30.399
3/17/2017	RCA4	BAETIS	INTERCALARIS	28.492
3/17/2017	RCA4	EPHEMERELLA	DOROTHEA	17.695
3/17/2017	RCA4	ALLOPERLA	SPP.	1.550
3/17/2017	RCA4	APHINEMURA	SPP.	0.153
3/17/2017	RCA4	ISOPERLA	TRANSMARINA	2.092

3/17/2017	RCA4	CHEUMATOPSYCHE	SPP.	3.043
3/17/2017	RCA4	HYDROPSYCHE	BETTENI	0.676
3/17/2017	RCA4	NEOPHYLAX	OLIGIUS	2.049
3/17/2017	RCC1	EPHEMERELLA	DOROTHEA	0.274
3/17/2017	RCC1	MACCAFFERTIUM	MODESTUM	0.767
3/17/2017	RCC1	PERLINELLA	DRYMO	1.925
3/17/2017	RCC1	ANISOCENTROPUS	PYRALOIDES	1.010
3/17/2017	RCC1	NEOPHYLAX	OLIGIUS	92.462
3/17/2017	RCC2	DANNELLA	SIMPLEX	5.191
3/17/2017	RCC2	EPHEMERELLA	DOROTHEA	6.136
3/17/2017	RCC2	MACCAFFERTIUM	MODESTUM	2.237
3/17/2017	RCC2	ALLOPERLA	SPP.	0.130
3/17/2017	RCC2	PERLINELLA	DRYMO	23.061
3/17/2017	RCC2	APHINEMURA	SPP.	6.194
3/17/2017	RCC2	CHEUMATOPSYCHE	SPP.	13.562
3/17/2017	RCC2	LEPIDOSTOMA	SPP.	0.228
3/17/2017	RCC2	NEOPHYLAX	OLIGIUS	2.654
3/17/2017	RCD2	MACCAFFERTIUM	MODESTUM	7.977
3/17/2017	RCD2	LEPIDOSTOMA	SPP.	11.887
3/17/2017	RCR1	BAETIS	INTERCALARIS	0.327
3/17/2017	RCR1	EPHEMERELLA	DOROTHEA	1.038
3/17/2017	RCR1	MACCAFFERTIUM	MODESTUM	0.426
3/17/2017	RCR1	PERLINELLA	DRYMO	2.399
3/17/2017	RCR1	APHINEMURA	SPP.	0.838
3/17/2017	RCR1	NEOPHYLAX	OLIGIUS	1.260
3/17/2017	RCR2	BAETIS	INTERCALARIS	2.108
3/17/2017	RCR2	EPHEMERELLA	DOROTHEA	2.977
3/17/2017	RCR2	MACCAFFERTIUM	MODESTUM	6.661
3/17/2017	RCR2	CHEUMATOPSYCHE	SPP.	1.081
3/17/2017	RCP1	MACCAFFERTIUM	MODESTUM	0.175
6/20/2017	RCA1	IRONOQUIA	PUNCTACISSIMA	1.493
6/20/2017	RCA3	MACCAFFERTIUM	MODESTUM	2.640
6/20/2017	RCA3	PERLINELLA	DRYMO	115.718
6/20/2017	RCA3	CHEUMATOPSYCHE	SPP.	90.772
6/20/2017	RCA3	HYDROPSYCHE	BETTENI	0.300
6/20/2017	RCA4	HYDROPSYCHE	BETTENI	35.636
6/20/2017	RCR1	MACCAFFERTIUM	MODESTUM	33.687
6/20/2017	RCR1	CHEUMATOPSYCHE	SPP.	4.894
6/20/2017	RCR1	HYDROPSYCHE	BETTENI	63.555
6/20/2017	RCR2	HYDROPSYCHE	BETTENI	333.770
6/20/2017	RCP1	MACCAFFERTIUM	MODESTUM	0.330

6/20/2017	RCP1	CHEUMATOPSYCHE	SPP.	17.019
6/20/2017	RCP1	HYDROPSYCHE	BETTENI	26.063
6/21/2017	RCC2	MACCAFFERTIUM	MODESTUM	28.829
6/21/2017	RCC2	PERLINELLA	DRYMO	0.317
6/21/2017	RCC2	DIPLECTRONA	MODESTA	5.023
6/21/2017	RCC2	PSILOTRETA	SPP.	30.536
6/21/2017	RCC2	NEOPHYLAX	OLIGIUS	13.311
6/21/2017	RCD1	BAETIS	SPP.	17.353
6/21/2017	RCD1	MACCAFFERTIUM	MODESTUM	32.178
6/21/2017	RCD1	HYDROPSYCHE	BETTENI	76.892
6/21/2017	RCD2	MACCAFFERTIUM	MODESTUM	0.513
6/21/2017	RCD2	CHEUMATOPSYCHE	SPP.	0.852
6/21/2017	RCD2	HYDROPSYCHE	BETTENI	0.981
10/18/2017	RCA1	BAETIS	SPP.	5.575
10/18/2017	RCA1	MACCAFFERTIUM	MODESTUM	6.320
10/18/2017	RCA1	CHEUMATOPSYCHE	SPP.	12.144
10/18/2017	RCA2	MACCAFFERTIUM	MODESTUM	227.269
10/18/2017	RCA4	DIPLECTRONA	MODESTA	5.927
10/18/2017	RCR1	MACCAFFERTIUM	MODESTUM	4.276
10/18/2017	RCR2	BAETIS	SPP.	4.518
10/18/2017	RCR2	MACCAFFERTIUM	MODESTUM	7.533
10/18/2017	RCR2	CHEUMATOPSYCHE	SPP.	7.658
10/18/2017	RCR2	CHIMARRA	SPP.	25.675
10/19/2017	RCC2	MACCAFFERTIUM	MODESTUM	17.766
10/19/2017	RCC2	PERLINELLA	DRYMO	140.205
10/19/2017	RCC2	DIPLECTRONA	MODESTA	286.811
10/19/2017	RCC2	LEPIDOSTOMA	SPP.	3.809
10/19/2017	RCD1	MACCAFFERTIUM	MODESTUM	18.751
10/19/2017	RCD1	CHEUMATOPSYCHE	SPP.	5.139
10/19/2017	RCD2	CHIMARRA	SPP.	17.161
2/18/2018	RCA1	EPHEMERELLA	DOROTHEA	1.054
2/18/2018	RCA1	MACCAFFERTIUM	MODESTUM	8.115
2/18/2018	RCA1	CHEUMATOPSYCHE	SPP.	7.037
2/18/2018	RCA1	LEPIDOSTOMA	SPP.	7.548
2/18/2018	RCA3	EPHEMERELLA	DOROTHEA	7.653
2/18/2018	RCA3	MACCAFFERTIUM	MODESTUM	20.275
2/18/2018	RCA3	LEPIDOSTOMA	SPP.	2.922
2/18/2018	RCA3	PYCNOPSYCHE	SCABRIPENNIS	6.800
2/18/2018	RCA3	CHIMARRA	SPP.	1.112
2/18/2018	RCA3	NEOPHYLAX	OLIGIUS	55.800
2/18/2018	RCA4	IRONOQUIA	PUNCTACISSIMA	48.855

2/18/2018	RCC2	DANNELLA	SIMPLEX	0.130
2/18/2018	RCC2	MACCAFFERTIUM	MODESTUM	2.084
2/18/2018	RCC2	ECCOPTURA	XANTHENES	0.129
2/18/2018	RCC2	ANISOCENTROPUS	PYRALOIDES	26.891
2/18/2018	RCC2	DIPLECTRONA	MODESTA	44.855
2/18/2018	RCC2	LEPIDOSTOMA	SPP.	82.098
2/18/2018	RCC2	PYCNOPSYCHE	SCABRIPENNIS	1.153
2/18/2018	RCC2	RHYACOPHILA	SPP.	1.651
2/18/2018	RCR1	MACCAFFERTIUM	MODESTUM	2.190
2/18/2018	RCR2	EPHEMERELLA	DOROTHEA	0.283
2/18/2018	RCR2	MACCAFFERTIUM	MODESTUM	27.819
2/18/2018	RCR2	CHEUMATOPSYCHE	SPP.	3.499
2/18/2018	RCR2	DIPLECTRONA	MODESTA	101.449
2/18/2018	RCR2	LEPIDOSTOMA	SPP.	62.391
2/18/2018	RCP1	BAETIS	SPP.	17.318
2/18/2018	RCP1	MACCAFFERTIUM	MODESTUM	4.976
2/18/2018	RCP1	DIPLECTRONA	MODESTA	1.762
2/18/2018	RCP1	PYCNOPSYCHE	SCABRIPENNIS	34.778
8/16/2018	RCC1	BAETIS	SPP.	2.057
8/16/2018	RCC1	DIPLECTRONA	MODESTA	0.882
8/16/2018	RCC2	DANNELLA	SIMPLEX	0.692
8/16/2018	RCC2	MACCAFFERTIUM	MODESTUM	7.256
8/16/2018	RCC2	CHEUMATOPSYCHE	SPP.	0.697
8/16/2018	RCC2	LEPIDOSTOMA	SPP.	0.325
8/16/2018	RCC2	PYCNOPSYCHE	SCABRIPENNIS	2.869
8/16/2018	RCC2	CHIMARRA	SPP.	0.737
8/16/2018	RCC2	NEOPHYLAX	OLIGIUS	2.905
8/16/2018	RCD1	PLAUDITUS	CESTUS	0.611
8/16/2018	RCD1	PERLINELLA	DRYMO	14.909
8/16/2018	RCD1	CHEUMATOPSYCHE	SPP.	0.010
8/17/2018	RCA3	BAETIS	SPP.	83.111
8/17/2018	RCA4	BAETIS	SPP.	51.817
8/17/2018	RCR1	BAETIS	SPP.	3.968
8/17/2018	RCR1	CHEUMATOPSYCHE	SPP.	0.731
8/17/2018	RCR2	BAETIS	INTERCALARIS	1.139
8/17/2018	RCR2	MACCAFFERTIUM	MODESTUM	0.155
8/17/2018	RCR2	CHEUMATOPSYCHE	SPP.	0.357
11/8/2018	RCA1	BAETIS	INTERCALARIS	16.052
11/8/2018	RCA1	CHEUMATOPSYCHE	SPP.	2.962
11/8/2018	RCA1	DIPLECTRONA	MODESTA	9.777
11/8/2018	RCA1	CHIMARRA	SPP.	38.058

11/8/2018	RCA2	BAETIS	SPP.	5.003
11/8/2018	RCA2	DIPLECTRONA	MODESTA	4.253
11/8/2018	RCA3	CHEUMATOPSYCHE	SPP.	310.506
11/8/2018	RCA3	HYDROPSYCHE	BETTENI	17.697
11/8/2018	RCA4	BAETIS	SPP.	410.559
11/8/2018	RCA4	MACCAFFERTIUM	MODESTUM	2.865
11/8/2018	RCA4	CHEUMATOPSYCHE	SPP.	14.448
11/8/2018	RCA4	HYDROPSYCHE	BETTENI	1.250
11/8/2018	RCC1	BAETIS	INTERCALARIS	0.465
11/8/2018	RCC1	DANNELLA	SIMPLEX	0.904
11/8/2018	RCC1	MACCAFFERTIUM	MODESTUM	2.473
11/8/2018	RCC1	CHEUMATOPSYCHE	SPP.	0.482
11/8/2018	RCC1	DIPLECTRONA	MODESTA	2.122
11/8/2018	RCC1	CHIMARRA	SPP.	0.352
11/8/2018	RCC2	BAETIS	INTERCALARIS	17.682
11/8/2018	RCC2	BAETIS	SPP.	0.415
11/8/2018	RCC2	DANNELLA	SIMPLEX	2.470
11/8/2018	RCC2	MACCAFFERTIUM	MODESTUM	2.317
11/8/2018	RCC2	ALLOPERLA	SPP.	1.962
11/8/2018	RCC2	PERLINELLA	DRYMO	23.627
11/8/2018	RCC2	DIPLECTRONA	MODESTA	0.596
11/8/2018	RCC2	RHYACOPHILA	TORVA	17.741
11/8/2018	RCD1	MACCAFFERTIUM	MODESTUM	4.936
11/8/2018	RCD1	CHEUMATOPSYCHE	SPP.	0.715
11/8/2018	RCD2	HYDROPSYCHE	BETTENI	8.155
11/8/2018	RCD2	CHEUMATOPSYCHE	SPP.	6.286
11/8/2018	RCP1	CHEUMATOPSYCHE	SPP.	9.779
2/25/2019	RCC1	BAETIS	SPP.	2.317
2/25/2019	RCC1	EPHEMERELLA	DOROTHEA	0.129
2/25/2019	RCC1	MACCAFFERTIUM	MODESTUM	34.528
2/25/2019	RCC1	ALLOPERLA	SPP.	7.812
2/25/2019	RCC1	PERLINELLA	DRYMO	0.118
2/25/2019	RCC1	APHINEMURA	SPP.	0.392
2/25/2019	RCC1	HYDROPSYCHE	BETTENI	4.716
2/25/2019	RCC2	EPHEMERELLA	DOROTHEA	1.643
2/25/2019	RCC2	MACCAFFERTIUM	MODESTUM	0.232
2/25/2019	RCC2	ALLOPERLA	SPP.	6.006
2/25/2019	RCC2	DIPLECTRONA	MODESTA	43.040
2/25/2019	RCC2	HYDROPSYCHE	BETTENI	54.962
2/25/2019	RCC2	PYCNOPSYCHE	SCABRIPENNIS	10.616
2/25/2019	RCC2	NEOPHYLAX	OLIGIUS	16.781

2/25/2019	RCD1	MACCAFFERTIUM	MODESTUM	1.380
2/25/2019	RCD1	CHEUMATOPSYCHE	SPP.	8.435
2/25/2019	RCD2	CHEUMATOPSYCHE	SPP.	11.752
2/25/2019	RCD2	HYDROPSYCHE	BETTENI	6.314
2/25/2019	RCP1	CHEUMATOPSYCHE	SPP.	0.459
2/26/2019	RCA1	CHEUMATOPSYCHE	SPP.	10.925
2/26/2019	RCA1	HYDROPSYCHE	BETTENI	8.843
2/26/2019	RCA2	BAETIS	INTERCALARIS	5.320
2/26/2019	RCA2	CHEUMATOPSYCHE	SPP.	0.099
2/26/2019	RCA3	PLAUDITUS	CESTUS	0.449
2/26/2019	RCA3	MACCAFFERTIUM	MODESTUM	3.697
2/26/2019	RCA3	CHEUMATOPSYCHE	SPP.	14.764
2/26/2019	RCA4	BAETIS	INTERCALARIS	72.322
2/26/2019	RCA4	MACCAFFERTIUM	MODESTUM	9.395
2/26/2019	RCA4	CHEUMATOPSYCHE	SPP.	1.436
2/26/2019	RCR1	BAETIS	INTERCALARIS	3.122
2/26/2019	RCR1	EPHEMERELLA	DOROTHEA	0.853
7/15/2019	RCC1	BAETIS	INTERCALARIS	2.096
7/15/2019	RCC1	PLAUDITUS	CESTUS	11.505
7/15/2019	RCC1	EPHEMERELLA	DOROTHEA	0.496
7/15/2019	RCC1	MACCAFFERTIUM	MODESTUM	0.826
7/15/2019	RCC1	ECCOPTURA	XANTHENES	6.958
7/15/2019	RCC1	CHEUMATOPSYCHE	SPP.	3.737
7/15/2019	RCC1	HYDROPSYCHE	BETTENI	4.738
7/15/2019	RCC2	MACCAFFERTIUM	MODESTUM	3.371
7/15/2019	RCC2	PERLINELLA	DRYMO	3.411
7/15/2019	RCC2	DIPLECTRONA	MODESTA	4.228
7/15/2019	RCC2	HYDROPSYCHE	BETTENI	11.190
7/15/2019	RCD1	HYDROPSYCHE	BETTENI	42.490
7/15/2019	RCD2	CHEUMATOPSYCHE	SPP.	0.833
7/15/2019	RCD2	HYDROPSYCHE	BETTENI	19.304
7/15/2019	RCP1	CHEUMATOPSYCHE	SPP.	0.537
7/15/2019	RCP1	HYDROPSYCHE	BETTENI	75.692
7/17/2019	RCA1			0.510
7/17/2019	RCA1	BAETIS	INTERCALARIS	3.719
7/17/2019	RCA1	MACCAFFERTIUM	MODESTUM	0.130
7/17/2019	RCA1	CHEUMATOPSYCHE	SPP.	0.209
7/17/2019	RCA1	HYDROPSYCHE	BETTENI	16.236
7/17/2019	RCA2	MACCAFFERTIUM	MODESTUM	7.845
7/17/2019	RCA2	CHEUMATOPSYCHE	SPP.	6.397
7/17/2019	RCA2	HYDROPSYCHE	BETTENI	9.440

7/17/2019	RCA3	BAETIS	INTERCALARIS	1.356
7/17/2019	RCA3	CHEUMATOPSYCHE	SPP.	2.843
7/17/2019	RCA3	HYDROPSYCHE	BETTENI	1.373
7/17/2019	RCA4	BAETIS	INTERCALARIS	2.610
7/17/2019	RCA4	MACCAFFERTIUM	MODESTUM	3.405
7/17/2019	RCA4	CHEUMATOPSYCHE	SPP.	2.776
7/17/2019	RCA4	HYDROPSYCHE	BETTENI	0.868
7/17/2019	RCR1	BAETIS	INTERCALARIS	1.194
7/17/2019	RCR1	DANNELLA	SIMPLEX	2.860
7/17/2019	RCR1	MACCAFFERTIUM	MODESTUM	4.820
7/17/2019	RCR1	CHEUMATOPSYCHE	SPP.	5.958
7/17/2019	RCR2	MACCAFFERTIUM	MODESTUM	16.618
7/17/2019	RCR2	CHEUMATOPSYCHE	SPP.	5.963
7/17/2019	RCR2	HYDROPSYCHE	BETTENI	12.844
11/20/2019	RCC1	MACCAFFERTIUM	MODESTUM	111.417
11/20/2019	RCC1	CHEUMATOPSYCHE	SPP.	191.855
11/20/2019	RCC1	HYDROPSYCHE	BETTENI	4.218
11/20/2019	RCC2	ALLOPERLA	SPP.	11.747
11/20/2019	RCC2	CHEUMATOPSYCHE	SPP.	14.481
11/20/2019	RCD1	BAETIS	SPP.	43.404
11/20/2019	RCD1	MACCAFFERTIUM	MODESTUM	47.057
11/20/2019	RCD1	ALLOPERLA	SPP.	0.861
11/20/2019	RCD1	CHEUMATOPSYCHE	SPP.	3.283
11/20/2019	RCD2	BAETIS	SPP.	0.340
11/20/2019	RCD2	CHEUMATOPSYCHE	SPP.	2.439
11/20/2019	RCD2	HYDROPSYCHE	BETTENI	0.344
11/20/2019	RCD2	CHIMARRA	SPP.	29.770
11/22/2019	RCA1	BAETIS	SPP.	40.916
11/22/2019	RCA1	DANNELLA	SIMPLEX	14.681
11/22/2019	RCA1	MACCAFFERTIUM	MODESTUM	7.051
11/22/2019	RCA1	PERLINELLA	DRYMO	0.340
11/22/2019	RCA2	BAETIS	INTERCALARIS	1.766
11/22/2019	RCA2	EPHEMERELLA	DOROTHEA	1.186
11/22/2019	RCA2	MACCAFFERTIUM	MODESTUM	0.110
11/22/2019	RCA2	CHEUMATOPSYCHE	SPP.	7.674
11/22/2019	RCR1	EPHEMERELLA	DOROTHEA	41.781
11/22/2019	RCR1	MACCAFFERTIUM	MODESTUM	0.788
11/22/2019	RCR1	HYDROPSYCHE	BETTENI	2.243
11/22/2019	RCR1	CHIMARRA	SPP.	0.161
11/22/2019	RCR2	BAETIS	INTERCALARIS	8.930
11/22/2019	RCR2	EPHEMERELLA	DOROTHEA	1.452

11/22/2019	RCR2	MACCAFFERTIUM	MODESTUM	2.178
11/22/2019	RCR2	CHEUMATOPSYCHE	SPP.	7.804
11/22/2019	RCR2	HYDROPSYCHE	BETTENI	27.382
11/22/2019	RCR2	CHIMARRA	SPP.	0.108
2/14/2020	RCA1	MACCAFFERTIUM	MODESTUM	15.079
2/14/2020	RCA1	CHEUMATOPSYCHE	SPP.	0.138
2/14/2020	RCA1	HYDROPSYCHE	BETTENI	64.579
2/14/2020	RCA1	CHIMARRA	SPP.	50.095
2/14/2020	RCA2	BAETIS	SPP.	0.021
2/14/2020	RCA2	MACCAFFERTIUM	MODESTUM	1.276
2/14/2020	RCA2	CHEUMATOPSYCHE	SPP.	6.105
2/14/2020	RCA2	HYDROPSYCHE	BETTENI	0.743
2/14/2020	RCA3	DANNELLA	SIMPLEX	0.089
2/14/2020	RCA4	MACCAFFERTIUM	MODESTUM	0.487
2/14/2020	RCC1	BAETIS	SPP.	4.324
2/14/2020	RCC1	DANNELLA	SIMPLEX	0.168
2/14/2020	RCC1	MACCAFFERTIUM	MODESTUM	63.801
2/14/2020	RCC1	ECCOPTURA	XANTHENES	4.925
2/14/2020	RCC1	CHEUMATOPSYCHE	SPP.	0.847
2/14/2020	RCC1	DIPLECTRONA	MODESTA	16.992
2/14/2020	RCC1	HYDROPSYCHE	BETTENI	3.494
2/14/2020	RCC1	LEPIDOSTOMA	SPP.	9.346
2/14/2020	RCC2	EPHEMERELLA	DOROTHEA	6.256
2/14/2020	RCC2	MACCAFFERTIUM	MODESTUM	0.731
2/14/2020	RCC2	CHEUMATOPSYCHE	SPP.	3.317
2/14/2020	RCC2	HYDROPSYCHE	BETTENI	0.857
2/14/2020	RCC2	LEPIDOSTOMA	SPP.	14.118
2/14/2020	RCD1	DANNELLA	SIMPLEX	17.581
2/14/2020	RCD1	MACCAFFERTIUM	MODESTUM	2.764
2/14/2020	RCD1	CHEUMATOPSYCHE	SPP.	3.582
2/14/2020	RCD2	CHEUMATOPSYCHE	SPP.	0.356
2/14/2020	RCR1	BAETIS	SPP.	4.304
2/14/2020	RCR1	DANNELLA	SIMPLEX	0.686
2/14/2020	RCR1	MACCAFFERTIUM	MODESTUM	3.387
2/14/2020	RCR1	CHEUMATOPSYCHE	SPP.	3.977
2/14/2020	RCR1	HYDROPSYCHE	BETTENI	9.167
2/14/2020	RCR1	CHIMARRA	SPP.	1.064
2/14/2020	RCR2	MACCAFFERTIUM	MODESTUM	7.068
2/14/2020	RCR2	CHEUMATOPSYCHE	SPP.	0.403
2/14/2020	RCR2	HYDROPSYCHE	BETTENI	5.420
2/14/2020	RCR2	CHIMARRA	SPP.	13.485

2/14/2020	RCP1	CHEUMATOPSYCHE	SPP.	1.872
7/28/2020	RCA1	DANNELLA	SIMPLEX	1.373
7/28/2020	RCA1	MACCAFFERTIUM	MODESTUM	0.415
7/28/2020	RCA2	MACCAFFERTIUM	MODESTUM	7.580
7/28/2020	RCA2	CHEUMATOPSYCHE	SPP.	0.892
7/28/2020	RCA2	HYDROPSYCHE	BETTENI	0.140
7/28/2020	RCA3			5.712
7/28/2020	RCA3	CHEUMATOPSYCHE	SPP.	1.351
7/28/2020	RCA3	HYDROPSYCHE	BETTENI	8.914
7/28/2020	RCA4	EPHEMERELLA	DOROTHEA	1.025
7/28/2020	RCC1	MACCAFFERTIUM	MODESTUM	1.637
7/28/2020	RCC1	ECCOPTURA	XANTHENES	1.482
7/28/2020	RCC1	CHEUMATOPSYCHE	SPP.	2.055
7/28/2020	RCC1	LEPIDOSTOMA	SPP.	0.871
7/28/2020	RCC2	MACCAFFERTIUM	MODESTUM	3.923
7/28/2020	RCC2	ALLOPERLA	SPP.	0.800
7/28/2020	RCC2	ECCOPTURA	XANTHENES	0.158
7/28/2020	RCC2	PERLINELLA	EPHYRE	2.358
7/28/2020	RCC2	CHEUMATOPSYCHE	SPP.	1.750
7/28/2020	RCC2	HYDROPSYCHE	BETTENI	9.650
7/28/2020	RCC2	PYCNOPSYCHE	SCABRIPENNIS	41.659
7/28/2020	RCD1	BAETIS	SPP.	2.281
7/28/2020	RCD1	DANNELLA	SIMPLEX	0.098
7/28/2020	RCD1	MACCAFFERTIUM	MODESTUM	4.200
7/28/2020	RCD1	CHEUMATOPSYCHE	SPP.	0.857
7/28/2020	RCD2	BAETIS	SPP.	3.758
7/28/2020	RCD2	MACCAFFERTIUM	MODESTUM	1.022
7/28/2020	RCD2	CHEUMATOPSYCHE	SPP.	4.884
7/28/2020	RCD2	HYDROPSYCHE	BETTENI	2.378
7/28/2020	RCR1	DANNELLA	SIMPLEX	7.614
7/28/2020	RCR1	MACCAFFERTIUM	MODESTUM	0.537
7/28/2020	RCR1	CHIMARRA	SPP.	1.495
7/28/2020	RCR1	HYDROPSYCHE	BETTENI	7.103
7/28/2020	RCR1	CHEUMATOPSYCHE	SPP.	6.957
7/28/2020	RCR2	MACCAFFERTIUM	MODESTUM	1.426
7/28/2020	RCR2	CHEUMATOPSYCHE	SPP.	1.715
7/28/2020	RCP1	MACCAFFERTIUM	MODESTUM	5.594
7/28/2020	RCP1	CHEUMATOPSYCHE	SPP.	1.736
7/28/2020	RCP1	HYDROPSYCHE	BETTENI	8.602

Appendix B7. Total measured and total count of EPT taxa across all sites from 2016-2020 that were included in the biomass analysis.

DATE	SITE	GENUS	SPECIES	MEASURED	COUNT
7/28/2016	RCA1	MACCAFFERTIUM	MODESTUM	3	3
7/28/2016	RCA1	STENONEMA	FEMORATUM	2	2
7/28/2016	RCA1	LEPIDOSTOMA	SPP.	2	2
7/28/2016	RCA1	IRONOQUIA	PUNCTACISSIMA	1	1
7/28/2016	RCA2	HABROPHLEBIA	SPP.	3	3
7/28/2016	RCA2	PERLINELLA	DRYMO	2	2
7/28/2016	RCA2	GOERA	CALCARATA	1	1
7/28/2016	RCA2	CHEUMATOPSYCHE	SPP.	8	8
7/28/2016	RCA2	LEPIDOSTOMA	SPP.	10	15
7/28/2016	RCA3	STENONEMA	FEMORATUM	1	1
7/28/2016	RCA3	HABROPHLEBIA	SPP.	1	1
7/28/2016	RCA3	PERLINELLA	DRYMO	4	4
7/28/2016	RCA3	HYDROPSYCHE	BETTENI	1	1
7/28/2016	RCA3	OLIGOSTOMIS	SPP.	2	2
7/28/2016	RCR1	BAETIS	INTERCALARIS	3	3
7/28/2016	RCR1	MACCAFFERTIUM	MODESTUM	3	3
7/28/2016	RCR1	STENONEMA	FEMORATUM	2	2
7/28/2016	RCR1	PTILOSTOMIS	SPP.	2	2
7/28/2016	RCR2	BAETIS	INTERCALARIS	2	2
7/28/2016	RCR2	MACCAFFERTIUM	MODESTUM	2	2
7/28/2016	RCR2	CHEUMATOPSYCHE	SPP.	4	4
7/28/2016	RCR2	DIPLECTRONA	MODESTA	3	3
7/28/2016	RCC1	PERLINELLA	DRYMO	2	2
7/28/2016	RCC1	DIPLECTRONA	MODESTA	1	1
7/28/2016	RCC2	MACCAFFERTIUM	MODESTUM	1	1
7/28/2016	RCC2	PERLINELLA	DRYMO	2	2
7/28/2016	RCC2	HYDROPSYCHE	BETTENI	2	2
11/14/2016	RCA1	MACCAFFERTIUM	MODESTUM	1	1
11/14/2016	RCA1	ALLOCAPNIA	SPP.	10	36
11/14/2016	RCA2	EURYLOPHELLA	DORIS	1	1
11/14/2016	RCA2	MACCAFFERTIUM	MODESTUM	4	4

11/14/2016	RCA2	ALLOCAPNIA	SPP.	10	53
11/14/2016	RCA2	ECCOPTURA	XANTHENES	1	1
11/14/2016	RCA2	PERLINELLA	DRYMO	1	1
11/14/2016	RCA2	CHEUMATOPSYCHE	SPP.	1	1
11/14/2016	RCA2	HYDROPSYCHE	BETTENI	2	2
11/14/2016	RCA3	ALLOCAPNIA	SPP.	6	6
11/14/2016	RCA4	ALLOCAPNIA	SPP.	3	3
11/14/2016	RCR1	MACCAFFERTIUM	MODESTUM	3	3
11/14/2016	RCR1	ALLOCAPNIA	SPP.	7	7
11/14/2016	RCR1	HYDROPSYCHE	BETTENI	3	3
11/14/2016	RCR2	PERLINELLA	DRYMO	1	1
11/14/2016	RCR2	PERLINELLA	EPHYRE	1	1
11/14/2016	RCR2	HYDROPSYCHE	BETTENI	3	3
11/16/2016	RCC2	EURYLOPHELLA	DORIS	1	1
11/16/2016	RCC2	MACCAFFERTIUM	MODESTUM	1	1
11/16/2016	RCC2	ALLOCAPNIA	SPP.	6	6
11/16/2016	RCC2	PERLINELLA	DRYMO	2	2
11/16/2016	RCC2	PERLINELLA	EPHYRE	1	1
11/16/2016	RCC2	HYDROPSYCHE	BETTENI	6	6
3/17/2017	RCA1	BAETIS	INTERCALARIS	9	9
3/17/2017	RCA1	BAETIS	SPP.	10	294
3/17/2017	RCA1	EPHEMERELLA	DOROTHEA	10	74
3/17/2017	RCA1	MACCAFFERTIUM	MODESTUM	2	2
3/17/2017	RCA1	ALLOPERLA	SPP.	10	28
3/17/2017	RCA1	APHINEMURA	SPP.	10	21
3/17/2017	RCA1	ISOPERLA	TRANSMARINA	10	30
3/17/2017	RCA1	IRONOQUIA	PUNCTACISSIMA	2	2
3/17/2017	RCA2	BAETIS	INTERCALARIS	4	4
3/17/2017	RCA2	EPHEMERELLA	DOROTHEA	1	1
3/17/2017	RCA2	MACCAFFERTIUM	MODESTUM	1	1
3/17/2017	RCA2	ALLOPERLA	SPP.	8	8
3/17/2017	RCA2	APHINEMURA	SPP.	1	1
3/17/2017	RCA2	LEPIDOSTOMA	SPP.	3	3
3/17/2017	RCA2	NEOPHYLAX	OLIGIUS	10	20

3/17/2017	RCA3	BAETIS	INTERCALARIS	4	4
3/17/2017	RCA3	EPHEMERELLA	DOROTHEA	4	4
3/17/2017	RCA3	MACCAFFERTIUM	MODESTUM	1	1
3/17/2017	RCA3	ALLOPERLA	SPP.	8	8
3/17/2017	RCA3	APHINEMURA	SPP.	3	3
3/17/2017	RCA3	DIPLOPERLA	DUPLICATA	1	1
3/17/2017	RCA3	LEPIDOSTOMA	SPP.	1	1
3/17/2017	RCA3	NEOPHYLAX	OLIGIUS	10	15
3/17/2017	RCA4	BAETIS	INTERCALARIS	3	3
3/17/2017	RCA4	EPHEMERELLA	DOROTHEA	1	1
3/17/2017	RCA4	ALLOPERLA	SPP.	1	1
3/17/2017	RCA4	APHINEMURA	SPP.	10	15
3/17/2017	RCA4	ISOPERLA	TRANSMARINA	5	5
3/17/2017	RCA4	CHEUMATOPSYCHE	SPP.	1	1
3/17/2017	RCA4	HYDROPSYCHE	BETTENI	1	1
3/17/2017	RCA4	NEOPHYLAX	OLIGIUS	10	20
3/17/2017	RCC1	EPHEMERELLA	DOROTHEA	1	1
3/17/2017	RCC1	MACCAFFERTIUM	MODESTUM	2	2
3/17/2017	RCC1	PERLINELLA	DRYMO	2	2
3/17/2017	RCC1	ANISOCENTROPUS	PYRALOIDES	1	1
3/17/2017	RCC1	NEOPHYLAX	OLIGIUS	10	29
3/17/2017	RCC2	DANNELLA	SIMPLEX	2	2
3/17/2017	RCC2	EPHEMERELLA	DOROTHEA	2	2
3/17/2017	RCC2	MACCAFFERTIUM	MODESTUM	2	2
3/17/2017	RCC2	ALLOPERLA	SPP.	1	1
3/17/2017	RCC2	PERLINELLA	DRYMO	2	2
3/17/2017	RCC2	APHINEMURA	SPP.	1	1
3/17/2017	RCC2	CHEUMATOPSYCHE	SPP.	2	2
3/17/2017	RCC2	LEPIDOSTOMA	SPP.	1	1
3/17/2017	RCC2	NEOPHYLAX	OLIGIUS	10	37
3/17/2017	RCD2	MACCAFFERTIUM	MODESTUM	2	2
3/17/2017	RCD2	LEPIDOSTOMA	SPP.	1	1
3/17/2017	RCR1	BAETIS	INTERCALARIS	10	16
3/17/2017	RCR1	EPHEMERELLA	DOROTHEA	2	2

3/17/2017	RCR1	MACCAFFERTIUM	MODESTUM	1	1
3/17/2017	RCR1	PERLINELLA	DRYMO	1	1
3/17/2017	RCR1	APHINEMURA	SPP.	1	1
3/17/2017	RCR1	NEOPHYLAX	OLIGIUS	3	3
3/17/2017	RCR2	BAETIS	INTERCALARIS	2	2
3/17/2017	RCR2	EPHEMERELLA	DOROTHEA	5	5
3/17/2017	RCR2	MACCAFFERTIUM	MODESTUM	4	4
3/17/2017	RCR2	CHEUMATOPSYCHE	SPP.	1	1
3/17/2017	RCP1	MACCAFFERTIUM	MODESTUM	1	1
6/20/2017	RCA1	IRONOQUIA	PUNCTACISSIMA	1	1
6/20/2017	RCA3	MACCAFFERTIUM	MODESTUM	1	1
6/20/2017	RCA3	PERLINELLA	DRYMO	1	1
6/20/2017	RCA3	CHEUMATOPSYCHE	SPP.	1	1
6/20/2017	RCA3	HYDROPSYCHE	BETTENI	1	1
6/20/2017	RCA4	HYDROPSYCHE	BETTENI	1	1
6/20/2017	RCR1	MACCAFFERTIUM	MODESTUM	1	1
6/20/2017	RCR1	CHEUMATOPSYCHE	SPP.	2	2
6/20/2017	RCR1	HYDROPSYCHE	BETTENI	1	1
6/20/2017	RCR2	HYDROPSYCHE	BETTENI	3	3
6/20/2017	RCP1	MACCAFFERTIUM	MODESTUM	5	5
6/20/2017	RCP1	CHEUMATOPSYCHE	SPP.	10	18
6/20/2017	RCP1	HYDROPSYCHE	BETTENI	1	1
6/21/2017	RCC2	MACCAFFERTIUM	MODESTUM	10	12
6/21/2017	RCC2	PERLINELLA	DRYMO	3	3
6/21/2017	RCC2	DIPLECTRONA	MODESTA	10	30
6/21/2017	RCC2	PSILOTRETA	SPP.	3	3
6/21/2017	RCC2	NEOPHYLAX	OLIGIUS	10	18
6/21/2017	RCD1	BAETIS	SPP.	1	1
6/21/2017	RCD1	MACCAFFERTIUM	MODESTUM	1	1
6/21/2017	RCD1	HYDROPSYCHE	BETTENI	10	18
6/21/2017	RCD2	MACCAFFERTIUM	MODESTUM	6	6
6/21/2017	RCD2	CHEUMATOPSYCHE	SPP.	7	7
6/21/2017	RCD2	HYDROPSYCHE	BETTENI	5	5
10/18/2017	RCA1	BAETIS	SPP.	3	3

10/18/2017	RCA1	MACCAFFERTIUM	MODESTUM	7	7
10/18/2017	RCA1	CHEUMATOPSYCHE	SPP.	4	4
10/18/2017	RCA2	MACCAFFERTIUM	MODESTUM	9	9
10/18/2017	RCA4	DIPLECTRONA	MODESTA	1	1
10/18/2017	RCR1	MACCAFFERTIUM	MODESTUM	4	4
10/18/2017	RCR2	BAETIS	SPP.	9	9
10/18/2017	RCR2	MACCAFFERTIUM	MODESTUM	10	14
10/18/2017	RCR2	CHEUMATOPSYCHE	SPP.	10	23
10/18/2017	RCR2	CHIMARRA	SPP.	3	3
10/19/2017	RCC2	MACCAFFERTIUM	MODESTUM	2	2
10/19/2017	RCC2	PERLINELLA	DRYMO	1	1
10/19/2017	RCC2	DIPLECTRONA	MODESTA	2	2
10/19/2017	RCC2	LEPIDOSTOMA	SPP.	2	2
10/19/2017	RCD1	MACCAFFERTIUM	MODESTUM	2	2
10/19/2017	RCD1	CHEUMATOPSYCHE	SPP.	10	10
10/19/2017	RCD2	CHIMARRA	SPP.	1	1
2/18/2018	RCA1	EPHEMERELLA	DOROTHEA	2	2
2/18/2018	RCA1	MACCAFFERTIUM	MODESTUM	2	2
2/18/2018	RCA1	CHEUMATOPSYCHE	SPP.	1	1
2/18/2018	RCA1	LEPIDOSTOMA	SPP.	1	1
2/18/2018	RCA3	EPHEMERELLA	DOROTHEA	10	23
2/18/2018	RCA3	MACCAFFERTIUM	MODESTUM	2	2
2/18/2018	RCA3	LEPIDOSTOMA	SPP.	1	1
2/18/2018	RCA3	PYCNOPSYCHE	SCABRIPENNIS	1	1
2/18/2018	RCA3	CHIMARRA	SPP.	5	5
2/18/2018	RCA3	NEOPHYLAX	OLIGIUS	2	2
2/18/2018	RCA4	IRONOQUIA	PUNCTACISSIMA	1	1
2/18/2018	RCC2	DANNELLA	SIMPLEX	4	4
2/18/2018	RCC2	MACCAFFERTIUM	MODESTUM	10	10
2/18/2018	RCC2	ECCOPTURA	XANTHENES	2	2
2/18/2018	RCC2	ANISOCENTROPUS	PYRALOIDES	1	1
2/18/2018	RCC2	DIPLECTRONA	MODESTA	3	3
2/18/2018	RCC2	LEPIDOSTOMA	SPP.	9	9
2/18/2018	RCC2	PYCNOPSYCHE	SCABRIPENNIS	3	3

2/18/2018	RCC2	RHYACOPHILA	SPP.	2	2
2/18/2018	RCR1	MACCAFFERTIUM	MODESTUM	6	6
2/18/2018	RCR2	EPHEMERELLA	DOROTHEA	1	1
2/18/2018	RCR2	MACCAFFERTIUM	MODESTUM	7	7
2/18/2018	RCR2	CHEUMATOPSYCHE	SPP.	2	2
2/18/2018	RCR2	DIPLECTRONA	MODESTA	1	1
2/18/2018	RCR2	LEPIDOSTOMA	SPP.	1	1
2/18/2018	RCP1	BAETIS	SPP.	1	1
2/18/2018	RCP1	MACCAFFERTIUM	MODESTUM	3	3
2/18/2018	RCP1	DIPLECTRONA	MODESTA	2	2
2/18/2018	RCP1	PYCNOPSYCHE	SCABRIPENNIS	4	4
8/16/2018	RCC1	BAETIS	SPP.	1	1
8/16/2018	RCC1	DIPLECTRONA	MODESTA	3	3
8/16/2018	RCC2	DANNELLA	SIMPLEX	2	2
8/16/2018	RCC2	MACCAFFERTIUM	MODESTUM	3	3
8/16/2018	RCC2	CHEUMATOPSYCHE	SPP.	1	1
8/16/2018	RCC2	LEPIDOSTOMA	SPP.	3	3
8/16/2018	RCC2	PYCNOPSYCHE	SCABRIPENNIS	2	2
8/16/2018	RCC2	CHIMARRA	SPP.	1	1
8/16/2018	RCC2	NEOPHYLAX	OLIGIUS	10	13
8/16/2018	RCD1	PLAUDITUS	CESTUS	8	8
8/16/2018	RCD1	PERLINELLA	DRYMO	1	1
8/16/2018	RCD1	CHEUMATOPSYCHE	SPP.	8	8
8/17/2018	RCA3	BAETIS	SPP.	10	10
8/17/2018	RCA4	BAETIS	SPP.	2	2
8/17/2018	RCR1	BAETIS	SPP.	2	2
8/17/2018	RCR1	CHEUMATOPSYCHE	SPP.	1	1
8/17/2018	RCR2	BAETIS	INTERCALARIS	2	2
8/17/2018	RCR2	MACCAFFERTIUM	MODESTUM	1	1
8/17/2018	RCR2	CHEUMATOPSYCHE	SPP.	3	3
11/8/2018	RCA1	BAETIS	INTERCALARIS	2	2
11/8/2018	RCA1	CHEUMATOPSYCHE	SPP.	10	20
11/8/2018	RCA1	DIPLECTRONA	MODESTA	2	2
11/8/2018	RCA1	CHIMARRA	SPP.	1	1

11/8/2018	RCA2	BAETIS	SPP.	1	1
11/8/2018	RCA2	DIPLECTRONA	MODESTA	6	6
11/8/2018	RCA3	CHEUMATOPSYCHE	SPP.	1	1
11/8/2018	RCA3	HYDROPSYCHE	BETTENI	1	1
11/8/2018	RCA4	BAETIS	SPP.	6	6
11/8/2018	RCA4	MACCAFFERTIUM	MODESTUM	1	1
11/8/2018	RCA4	CHEUMATOPSYCHE	SPP.	4	4
11/8/2018	RCA4	HYDROPSYCHE	BETTENI	2	2
11/8/2018	RCC1	BAETIS	INTERCALARIS	10	18
11/8/2018	RCC1	DANNELLA	SIMPLEX	1	1
11/8/2018	RCC1	MACCAFFERTIUM	MODESTUM	10	25
11/8/2018	RCC1	CHEUMATOPSYCHE	SPP.	10	33
11/8/2018	RCC1	DIPLECTRONA	MODESTA	1	1
11/8/2018	RCC1	CHIMARRA	SPP.	1	1
11/8/2018	RCC2	BAETIS	INTERCALARIS	1	1
11/8/2018	RCC2	BAETIS	SPP.	1	1
11/8/2018	RCC2	DANNELLA	SIMPLEX	1	1
11/8/2018	RCC2	MACCAFFERTIUM	MODESTUM	7	7
11/8/2018	RCC2	ALLOPERLA	SPP.	10	10
11/8/2018	RCC2	PERLINELLA	DRYMO	4	4
11/8/2018	RCC2	DIPLECTRONA	MODESTA	10	12
11/8/2018	RCC2	RHYACOPHILA	TORVA	2	2
11/8/2018	RCD1	MACCAFFERTIUM	MODESTUM	2	2
11/8/2018	RCD1	CHEUMATOPSYCHE	SPP.	10	162
11/8/2018	RCD2	HYDROPSYCHE	BETTENI	2	2
11/8/2018	RCD2	CHEUMATOPSYCHE	SPP.	10	162
11/8/2018	RCP1	CHEUMATOPSYCHE	SPP.	6	6
2/25/2019	RCC1	BAETIS	SPP.	4	4
2/25/2019	RCC1	EPHEMERELLA	DOROTHEA	10	23
2/25/2019	RCC1	MACCAFFERTIUM	MODESTUM	7	7
2/25/2019	RCC1	ALLOPERLA	SPP.	1	1
2/25/2019	RCC1	PERLINELLA	DRYMO	1	1
2/25/2019	RCC1	APHINEMURA	SPP.	1	1
2/25/2019	RCC1	HYDROPSYCHE	BETTENI	9	9

2/25/2019	RCC2	EPHEMERELLA	DOROTHEA	10	19
2/25/2019	RCC2	MACCAFFERTIUM	MODESTUM	6	6
2/25/2019	RCC2	ALLOPERLA	SPP.	10	10
2/25/2019	RCC2	DIPLECTRONA	MODESTA	1	1
2/25/2019	RCC2	HYDROPSYCHE	BETTENI	1	1
2/25/2019	RCC2	PYCNOPSYCHE	SCABRIPENNIS	1	1
2/25/2019	RCC2	NEOPHYLAX	OLIGIUS	10	10
2/25/2019	RCD1	MACCAFFERTIUM	MODESTUM	1	1
2/25/2019	RCD1	CHEUMATOPSYCHE	SPP.	10	42
2/25/2019	RCD2	CHEUMATOPSYCHE	SPP.	10	42
2/25/2019	RCD2	HYDROPSYCHE	BETTENI	4	4
2/25/2019	RCP1	CHEUMATOPSYCHE	SPP.	3	3
2/26/2019	RCA1	CHEUMATOPSYCHE	SPP.	2	2
2/26/2019	RCA1	HYDROPSYCHE	BETTENI	2	2
2/26/2019	RCA2	BAETIS	INTERCALARIS	4	4
2/26/2019	RCA2	CHEUMATOPSYCHE	SPP.	10	10
2/26/2019	RCA3	PLAUDITUS	CESTUS	1	1
2/26/2019	RCA3	MACCAFFERTIUM	MODESTUM	1	1
2/26/2019	RCA3	CHEUMATOPSYCHE	SPP.	4	4
2/26/2019	RCA4	BAETIS	INTERCALARIS	10	11
2/26/2019	RCA4	MACCAFFERTIUM	MODESTUM	1	1
2/26/2019	RCA4	CHEUMATOPSYCHE	SPP.	5	5
2/26/2019	RCR1	BAETIS	INTERCALARIS	2	2
2/26/2019	RCR1	EPHEMERELLA	DOROTHEA	1	1
7/15/2019	RCC1	BAETIS	INTERCALARIS	2	2
7/15/2019	RCC1	PLAUDITUS	CESTUS	3	3
7/15/2019	RCC1	EPHEMERELLA	DOROTHEA	2	2
7/15/2019	RCC1	MACCAFFERTIUM	MODESTUM	6	6
7/15/2019	RCC1	ECCOPTURA	XANTHENES	9	9
7/15/2019	RCC1	CHEUMATOPSYCHE	SPP.	10	18
7/15/2019	RCC1	HYDROPSYCHE	BETTENI	10	68
7/15/2019	RCC2	MACCAFFERTIUM	MODESTUM	7	7
7/15/2019	RCC2	PERLINELLA	DRYMO	7	7
7/15/2019	RCC2	DIPLECTRONA	MODESTA	1	1

7/15/2019	RCC2	HYDROPSYCHE	BETTENI	2	2
7/15/2019	RCD1	HYDROPSYCHE	BETTENI	10	10
7/15/2019	RCD2	CHEUMATOPSYCHE	SPP.	10	25
7/15/2019	RCD2	HYDROPSYCHE	BETTENI	5	5
7/15/2019	RCP1	CHEUMATOPSYCHE	SPP.	10	151
7/15/2019	RCP1	HYDROPSYCHE	BETTENI	10	67
7/17/2019	RCA1			1	1
7/17/2019	RCA1	BAETIS	INTERCALARIS	5	5
7/17/2019	RCA1	MACCAFFERTIUM	MODESTUM	2	2
7/17/2019	RCA1	CHEUMATOPSYCHE	SPP.	10	86
7/17/2019	RCA1	HYDROPSYCHE	BETTENI	10	30
7/17/2019	RCA2	MACCAFFERTIUM	MODESTUM	1	1
7/17/2019	RCA2	CHEUMATOPSYCHE	SPP.	10	36
7/17/2019	RCA2	HYDROPSYCHE	BETTENI	10	11
7/17/2019	RCA3	BAETIS	INTERCALARIS	10	22
7/17/2019	RCA3	CHEUMATOPSYCHE	SPP.	10	63
7/17/2019	RCA3	HYDROPSYCHE	BETTENI	10	106
7/17/2019	RCA4	BAETIS	INTERCALARIS	1	1
7/17/2019	RCA4	MACCAFFERTIUM	MODESTUM	7	7
7/17/2019	RCA4	CHEUMATOPSYCHE	SPP.	10	23
7/17/2019	RCA4	HYDROPSYCHE	BETTENI	7	7
7/17/2019	RCR1	BAETIS	INTERCALARIS	4	4
7/17/2019	RCR1	DANNELLA	SIMPLEX	3	3
7/17/2019	RCR1	MACCAFFERTIUM	MODESTUM	10	19
7/17/2019	RCR1	CHEUMATOPSYCHE	SPP.	10	19
7/17/2019	RCR2	MACCAFFERTIUM	MODESTUM	10	14
7/17/2019	RCR2	CHEUMATOPSYCHE	SPP.	10	48
7/17/2019	RCR2	HYDROPSYCHE	BETTENI	10	48
11/20/2019	RCC1	MACCAFFERTIUM	MODESTUM	2	2
11/20/2019	RCC1	CHEUMATOPSYCHE	SPP.	7	7
11/20/2019	RCC1	HYDROPSYCHE	BETTENI	7	7
11/20/2019	RCC2	ALLOPERLA	SPP.	3	3
11/20/2019	RCC2	CHEUMATOPSYCHE	SPP.	1	1
11/20/2019	RCD1	BAETIS	SPP.	1	1

11/20/2019	RCD1	MACCAFFERTIUM	MODESTUM	3	3
11/20/2019	RCD1	ALLOPERLA	SPP.	3	3
11/20/2019	RCD1	CHEUMATOPSYCHE	SPP.	1	1
11/20/2019	RCD2	BAETIS	SPP.	5	5
11/20/2019	RCD2	CHEUMATOPSYCHE	SPP.	5	5
11/20/2019	RCD2	HYDROPSYCHE	BETTENI	1	1
11/20/2019	RCD2	CHIMARRA	SPP.	1	1
11/22/2019	RCA1	BAETIS	SPP.	1	1
11/22/2019	RCA1	DANNELLA	SIMPLEX	9	9
11/22/2019	RCA1	MACCAFFERTIUM	MODESTUM	1	1
11/22/2019	RCA1	PERLINELLA	DRYMO	1	1
11/22/2019	RCA2	BAETIS	INTERCALARIS	6	6
11/22/2019	RCA2	EPHEMERELLA	DOROTHEA	2	2
11/22/2019	RCA2	MACCAFFERTIUM	MODESTUM	2	2
11/22/2019	RCA2	CHEUMATOPSYCHE	SPP.	3	3
11/22/2019	RCR1	EPHEMERELLA	DOROTHEA	5	5
11/22/2019	RCR1	MACCAFFERTIUM	MODESTUM	10	101
11/22/2019	RCR1	HYDROPSYCHE	BETTENI	2	2
11/22/2019	RCR1	CHIMARRA	SPP.	10	11
11/22/2019	RCR2	BAETIS	INTERCALARIS	3	3
11/22/2019	RCR2	EPHEMERELLA	DOROTHEA	1	1
11/22/2019	RCR2	MACCAFFERTIUM	MODESTUM	10	17
11/22/2019	RCR2	CHEUMATOPSYCHE	SPP.	5	5
11/22/2019	RCR2	HYDROPSYCHE	BETTENI	3	3
11/22/2019	RCR2	CHIMARRA	SPP.	1	1
2/14/2020	RCA1	MACCAFFERTIUM	MODESTUM	10	32
2/14/2020	RCA1	CHEUMATOPSYCHE	SPP.	5	5
2/14/2020	RCA1	HYDROPSYCHE	BETTENI	1	1
2/14/2020	RCA1	CHIMARRA	SPP.	2	2
2/14/2020	RCA2	BAETIS	SPP.	5	5
2/14/2020	RCA2	MACCAFFERTIUM	MODESTUM	10	10
2/14/2020	RCA2	CHEUMATOPSYCHE	SPP.	3	3
2/14/2020	RCA2	HYDROPSYCHE	BETTENI	4	4
2/14/2020	RCA3	DANNELLA	SIMPLEX	1	1

2/14/2020	RCA4	MACCAFFERTIUM	MODESTUM	1	1
2/14/2020	RCC1	BAETIS	SPP.	1	1
2/14/2020	RCC1	DANNELLA	SIMPLEX	3	3
2/14/2020	RCC1	MACCAFFERTIUM	MODESTUM	4	4
2/14/2020	RCC1	ECCOPTURA	XANTHENES	3	3
2/14/2020	RCC1	CHEUMATOPSYCHE	SPP.	2	2
2/14/2020	RCC1	DIPLECTRONA	MODESTA	1	1
2/14/2020	RCC1	HYDROPSYCHE	BETTENI	3	3
2/14/2020	RCC1	LEPIDOSTOMA	SPP.	10	14
2/14/2020	RCC2	EPHEMERELLA	DOROTHEA	10	16
2/14/2020	RCC2	MACCAFFERTIUM	MODESTUM	10	23
2/14/2020	RCC2	CHEUMATOPSYCHE	SPP.	8	8
2/14/2020	RCC2	HYDROPSYCHE	BETTENI	1	1
2/14/2020	RCC2	LEPIDOSTOMA	SPP.	4	4
2/14/2020	RCD1	DANNELLA	SIMPLEX	1	1
2/14/2020	RCD1	MACCAFFERTIUM	MODESTUM	1	1
2/14/2020	RCD1	CHEUMATOPSYCHE	SPP.	1	1
2/14/2020	RCD2	CHEUMATOPSYCHE	SPP.	6	6
2/14/2020	RCR1	BAETIS	SPP.	10	11
2/14/2020	RCR1	DANNELLA	SIMPLEX	2	2
2/14/2020	RCR1	MACCAFFERTIUM	MODESTUM	10	146
2/14/2020	RCR1	CHEUMATOPSYCHE	SPP.	9	9
2/14/2020	RCR1	HYDROPSYCHE	BETTENI	3	3
2/14/2020	RCR1	CHIMARRA	SPP.	10	20
2/14/2020	RCR2	MACCAFFERTIUM	MODESTUM	10	61
2/14/2020	RCR2	CHEUMATOPSYCHE	SPP.	10	19
2/14/2020	RCR2	HYDROPSYCHE	BETTENI	7	7
2/14/2020	RCR2	CHIMARRA	SPP.	10	21
2/14/2020	RCP1	CHEUMATOPSYCHE	SPP.	2	2
7/28/2020	RCA1	DANNELLA	SIMPLEX	10	35
7/28/2020	RCA1	MACCAFFERTIUM	MODESTUM	10	27
7/28/2020	RCA2	MACCAFFERTIUM	MODESTUM	1	1
7/28/2020	RCA2	CHEUMATOPSYCHE	SPP.	1	1
7/28/2020	RCA2	HYDROPSYCHE	BETTENI	1	1

7/28/2020	RCA3			1	1
7/28/2020	RCA3	CHEUMATOPSYCHE	SPP.	6	6
7/28/2020	RCA3	HYDROPSYCHE	BETTENI	3	3
7/28/2020	RCA4	EPHEMERELLA	DOROTHEA	1	1
7/28/2020	RCC1	MACCAFFERTIUM	MODESTUM	3	3
7/28/2020	RCC1	ECCOPTURA	XANTHENES	10	17
7/28/2020	RCC1	CHEUMATOPSYCHE	SPP.	2	2
7/28/2020	RCC1	LEPIDOSTOMA	SPP.	3	3
7/28/2020	RCC2	MACCAFFERTIUM	MODESTUM	7	7
7/28/2020	RCC2	ALLOPERLA	SPP.	3	3
7/28/2020	RCC2	ECCOPTURA	XANTHENES	10	11
7/28/2020	RCC2	PERLINELLA	EPHYRE	4	4
7/28/2020	RCC2	CHEUMATOPSYCHE	SPP.	6	6
7/28/2020	RCC2	HYDROPSYCHE	BETTENI	5	5
7/28/2020	RCC2	PYCNOPSYCHE	SCABRIPENNIS	10	11
7/28/2020	RCD1	BAETIS	SPP.	1	1
7/28/2020	RCD1	DANNELLA	SIMPLEX	2	2
7/28/2020	RCD1	MACCAFFERTIUM	MODESTUM	5	5
7/28/2020	RCD1	CHEUMATOPSYCHE	SPP.	2	2
7/28/2020	RCD2	BAETIS	SPP.	2	2
7/28/2020	RCD2	MACCAFFERTIUM	MODESTUM	1	1
7/28/2020	RCD2	CHEUMATOPSYCHE	SPP.	3	3
7/28/2020	RCD2	HYDROPSYCHE	BETTENI	7	7
7/28/2020	RCR1	DANNELLA	SIMPLEX	4	4
7/28/2020	RCR1	MACCAFFERTIUM	MODESTUM	10	31
7/28/2020	RCR1	CHIMARRA	SPP.	1	1
7/28/2020	RCR1	HYDROPSYCHE	BETTENI	1	1
7/28/2020	RCR1	CHEUMATOPSYCHE	SPP.	4	4
7/28/2020	RCR2	MACCAFFERTIUM	MODESTUM	10	27
7/28/2020	RCR2	CHEUMATOPSYCHE	SPP.	2	2
7/28/2020	RCP1	MACCAFFERTIUM	MODESTUM	3	3
7/28/2020	RCP1	CHEUMATOPSYCHE	SPP.	5	5
7/28/2020	RCP1	HYDROPSYCHE	BETTENI	3	3
TOTAL				**1718**	**3924**

APPENDIX C: WATER CHEMISTRY

Appendix C1. Temperature (Temp), dissolved oxygen (DO), specific conductivity (SC), and pH values for all sites from 2016-2020. **Note highlighted cells indicate no data was collected due to field instrument malfunctions.*

SITE	DATE	SEASON	TEMP (°C)	DO (mg/L)	SC (µS/cm)	pH
D2	2/19/2016	WINTER	10.68	11.62	84	7.92
D1	2/19/2016	WINTER	10.68	11.62	84	7.92
P1	2/19/2016	WINTER	10.37	11.30	49.00	9.310
C2	2/19/2016	WINTER	10.08	11.04	36	9.2
A4	2/19/2016	WINTER	6.08	11.64	53	6.62
A3	2/19/2016	WINTER	6.56	11.95	61	7.54
A2	2/19/2016	WINTER	8.37	11.58	88	5.54
A1	2/19/2016	WINTER	8.25	11.45	66	7.07
R2	2/19/2016	WINTER	9.37	11.3	64	8.52
R1	2/19/2016	WINTER	8.91	11.48	59	7.55
D2	4/29/2016	SPRING				
D1	4/29/2016	SPRING				
P1	4/29/2016	SPRING				
C2	4/29/2016	SPRING				
A4	4/29/2016	SPRING	16.5	105	72.7	6
A3	4/29/2016	SPRING	16.8	106.1	87.8	5.68
A2	4/29/2016	SPRING	16.7	106.5	111.5	5.47
A1	4/29/2016	SPRING	17.3	106.7	92.9	5.53
R2	4/29/2016	SPRING	17.8	106.8	78.1	5.53
R1	4/29/2016	SPRING	17.8	106.6	63	5.33
D2	7/28/2016	SUMMER	25.8	6.39	248.58	7.18
D1	7/28/2016	SUMMER	26.7	7.87	110	7.05
P1	7/28/2016	SUMMER	24	7.39	146.3	7.44
C1	7/28/2016	SUMMER	26.2	6.28	86.4	7.54
C2	7/28/2016	SUMMER	24.7	8.64	72.6	7.51
A4	7/28/2016	SUMMER	21.6	7.26	145.7	7.76
A3	7/28/2016	SUMMER	18.5	12.9	140.6	7.18
A2	7/28/2016	SUMMER	23.6	7.26	133.6	7.49
A1	7/28/2016	SUMMER	24.5	8.5	152.5	7.56
R2	7/28/2016	SUMMER	23.3	8.52	97.3	7.39
R1	7/28/2016	SUMMER	24.5	8.13	129.9	7.45
D2	11/14/2016	FALL	9.4	6.65	158	6.4
D1	11/14/2016	FALL	8.4	11.48	97.3	6.51
P1	11/14/2016	FALL	9.4	9.34	113	6.4
C2	11/14/2016	FALL	10.5	8.76	47.3	6.77

A4	11/14/2016	FALL	8.5	9.3	86.6	8.3
A3	11/14/2016	FALL	9	7.82	93.3	7.35
A2	11/14/2016	FALL	9.7	10.2	117.3	7.31
A1	11/14/2016	FALL	10.3	13.55	106.6	7.59
R2	11/14/2016	FALL	11	10.42	95.5	7.37
R1	11/14/2016	FALL	11.4	11.45	101.4	7.11
D2	3/17/2017	SPRING	10.6	11.21	96.2	8.38
D1	3/17/2017	SPRING	11.3	10.87	90.1	8.67
P1	3/17/2017	SPRING	10	11.43	63.9	7.57
C1	3/17/2017	SPRING	8.2	11.79	36.7	6.99
C2	3/17/2017	SPRING	8.8	11.77	36.4	6.42
A4	3/17/2017	SPRING	4.2	13.16	61.7	7.08
A3	3/17/2017	SPRING	4	13.16	72.6	7.06
A2	3/17/2017	SPRING	4.6	12.95	96.7	6.96
A1	3/17/2017	SPRING	4.1	13.1	77	6.24
R2	3/17/2017	SPRING	2.6	14.77	54	7.4
R1	3/17/2017	SPRING	6.6	12.3	73.8	7.4
D2	6/20/2017	SUMMER	22.5	7.68	105.8	7.99
D1	6/20/2017	SUMMER	21.2	6.98	91	6.55
P1	6/20/2017	SUMMER	24.6	6.48	66.2	7.02
C1	6/20/2017	SUMMER	19.8	8	48.7	6.87
C2	6/20/2017	SUMMER	19.5	8.49	47.1	6.8
A4	6/20/2017	SUMMER	20.7	6.44	107.1	7.2
A3	6/20/2017	SUMMER	21	107.3	7.47	6.8
A2	6/20/2017	SUMMER	20.4	7.98	93.9	6.98
A1	6/20/2017	SUMMER	21.2	8.07	116.6	6.83
R2	6/20/2017	SUMMER	21	7.9	98.5	6.7
R1	6/20/2017	SUMMER	21.4	8.02	100	6.93
D2	10/18/2017	FALL	11.6	6	170	6.99
D1	10/18/2017	FALL	11.6	8	85.7	7.2
P1	10/18/2017	FALL	12.5	9.16	113.2	7.17
C1	10/18/2017	FALL	12	9.83	49.4	7.02
C2	10/18/2017	FALL	12.3	8.96	46.5	7.12
A4	10/18/2017	FALL	11.1	8.8	106.8	7.02
A3	10/18/2017	FALL	12.5	5.12	98.1	7.21
A2	10/18/2017	FALL	11.1	7.75	106.1	7.38
A1	10/18/2017	FALL	11.4	9.89	107.6	7.46
R2	10/18/2017	FALL	12.5	8.54	86.3	6.9
R1	10/18/2017	FALL	14	9	95.2	7.25
P1	2/19/2018	WINTER	13.1	10.14	68.5	6.45
C1	2/19/2018	WINTER	11.9	10.18	42.1	6.6
C2	2/19/2018	WINTER	11.7	10.26	41.8	6.85
A4	2/19/2018	WINTER	10.7	10.73	74.2	5.06

A3	2/19/2018	WINTER	10.8	10.22	69.9	5.8
A1	2/19/2018	WINTER	11.1	11.06	87.2	6.2
R2	2/19/2018	WINTER	11.5	10.83	78.9	6.17
R1	2/19/2018	WINTER	11.6	10.58	80.9	6.74
D2	8/16/2018	SUMMER	23.8	2.46	174.6	6.26
D1	8/16/2018	SUMMER	25.1	3.14	173.6	6.68
C1	8/16/2018	SUMMER	23.3	8.22	62	7.47
C2	8/16/2018	SUMMER	22.1	7.17	60.8	7.01
A4	8/16/2018	SUMMER	24.3	2.02	147.1	5.9
A3	8/16/2018	SUMMER	24.1	1.18	289.6	6.44
A2	8/16/2018	SUMMER	24.3	1.12	70.7	6.63
R2	8/16/2018	SUMMER	22.7	6.71	126.5	7.07
R1	8/16/2018	SUMMER	23.5	6.11	140.6	7.01
D2	11/8/2018	FALL	14.3	8.47	115.2	5.96
D1	11/8/2018	FALL	14.8	8.73	101.6	6.07
P1	11/8/2018	FALL	15	8.3	101.6	6.07
C1	11/8/2018	FALL	14.3	10.02	51.9	6.19
C2	11/8/2018	FALL	14.3	10.1	42.5	6.17
A4	11/8/2018	FALL	16.2	10.65	90.8	6.13
A3	11/8/2018	FALL	17.2	7.35	151.3	6.25
A2	11/8/2018	FALL	17	8.89	157	6.49
A1	11/8/2018	FALL	17.1	10.73	140.3	6.66
D2	2/25/2019	WINTER	7.2	9.55	67.6	6.2
D1	2/25/2019	WINTER	6.8	9.88	62.6	5.99
P1	2/25/2019	WINTER	8.8	9.03	30.5	6.21
C1	2/25/2019	WINTER	8.8	8.75	27.4	6.17
C2	2/25/2019	WINTER	9.3	8.67	35.5	6.35
A4	2/25/2019	WINTER	6.2	9.89	47.5	6.56
A3	2/25/2019	WINTER	6.7	9.58	109.6	6.49
A2	2/25/2019	WINTER	7.1	9.04	31.5	6.38
A1	2/25/2019	WINTER	7.6	10.02	104.5	6.38
R2	2/25/2019	WINTER	10	9.31	61.32	6.39
R1	2/25/2019	WINTER	10.3	8.11	75.3	6.57
D2	7/15/2019	SUMMER	24.8	2.52	225.6	5.72
D1	7/15/2019	SUMMER	26.4	5.45	230.8	6.662
P1	7/15/2019	SUMMER	27.1	6.04	129.5	6.67
C1	7/15/2019	SUMMER	22.9	9.76	63	6.79
C2	7/15/2019	SUMMER	22.2	7.76	52.1	6.71
A4	7/15/2019	SUMMER	25.2	5.5	138	6.42
A3	7/15/2019	SUMMER	25.1	3.74	180.4	6.47
A2	7/15/2019	SUMMER	25.8	2.28	209.6	6.73
A1	7/15/2019	SUMMER	28	5.4	162.8	6.71
R2	7/15/2019	SUMMER	29.7	6.51	136.6	7.27

R1	7/15/2019	SUMMER	27.8	6.67	151.8	7.17
D2	11/20/2019	FALL	8.5	10.41	129.7	5.95
D1	11/20/2019	FALL	9.7	11.33	105.6	6.06
P1	11/20/2019	FALL	10.3	11.24	80.5	6.07
C1	11/20/2019	FALL	12.9	10.47	51.7	5.85
C2	11/20/2019	FALL	11.6	9.73	46.6	5.74
A4	11/20/2019	FALL	9.2	11.04	89.3	5.24
A3	11/20/2019	FALL	11.1	10.11	122.2	5.42
A2	11/20/2019	FALL	10.2	10.89	165.9	5.97
A1	11/20/2019	FALL	11.1	14.17	136.6	5.51
R2	11/20/2019	FALL	12	12.91	93.9	5.64
R1	11/20/2019	FALL	11.8	13.83	103.4	5.62
D2	2/14/2020	WINTER	11	13.14	82.9	5.47
D1	2/14/2020	WINTER	12.6	11.72	78.6	5.91
P1	2/14/2020	WINTER	13.8	11.36	42.6	5.73
C1	2/14/2020	WINTER	12.9	11.52	33	5.96
C2	2/14/2020	WINTER	12.5	12.33	29.1	5.53
A4	2/14/2020	WINTER	9.4	11.26	71.7	5.58
A3	2/14/2020	WINTER	12.2	9.22	91	6.11
A2	2/14/2020	WINTER	11.8	9.52	123.5	6.16
A1	2/14/2020	WINTER	12.2	11.88	93.2	5.93
R2	2/14/2020	WINTER	12.6	12.67	60.2	5.93
R1	2/14/2020	WINTER	13.3	10.83	72.4	5.98
D2	7/26/2020	SUMMER	24.8	6.63	236.3	6.68
D1	7/26/2020	SUMMER	30.3	6.8	181.3	6.6
P1	7/26/2020	SUMMER	28.6	6.22	129.7	6.34
C1	7/26/2020	SUMMER	23.7	7.34	68.3	6.5
C2	7/26/2020	SUMMER	23	7.5	57.9	6.52
A4	7/26/2020	SUMMER	23.8	4.45	115.4	6.57
A3	7/26/2020	SUMMER	23.9	3.33	166.3	6.6
A2	7/26/2020	SUMMER	24.7	4.09	191.3	7.03
A1	7/26/2020	SUMMER	25.8	5.1	171.9	6.82
R2	7/26/2020	SUMMER	26.7	7.23	114	6.9
R1	7/26/2020	SUMMER	26.9	6.32	136.2	6.85

APPENDIX D: BACI SAMPLE T-TEST

Appendix D1. Total abundance for sites C2 (control) and D2 (impact) per sampling date. 11/8/2018 is the first post-restoration sample collection.

DATE	C2	D2
7/28/2016	26	28
11/16/2016	56	5
3/17/2017	80	18
6/21/2017	91	28
10/19/2017	62	39
11/8/2018	58	188
2/25/2019	68	84
7/15/2019	27	49
11/20/2019	17	36
2/14/2020	85	100
7/28/2020	80	83

Appendix D2. Total abundance in the control (C2) and impact (D2) locations. The 'Difference' column is the difference between total abundance in the control and impact location in the before and after periods. The difference in total abundance before and after were input into a two-sample t-test assuming unequal variance (α = 0.05).

BEFORE		**AFTER**		**DIFFERENCE**	
CONTROL	IMPACT	CONTROL	IMPACT	BEFORE	AFTER
26	28	58	188	-2	-130
56	5	68	84	51	-16
80	18	27	49	62	-22
91	28	17	36	63	-19

Appendix D2. Results of the BACI two-sample t-test assuming unequal variance (α = 0.05). *p*-value < 0.05, therefore; there was a significant difference in total abundance between the control (C2) and the impact (D1) location before and after restoration.

	BEFORE	*AFTER*
Mean	39.4	-34.1667
Variance	796.3	2246.167
P(T<=t) one-tail	0.006453	
t Critical one-tail	1.859548	
P(T<=t) two-tail	0.012906	
t Critical two-tail	2.306004	