

Biological and Water Quality Assessment of the

Peace River Basin

Sampled January 30, 2008

Bureau of Assessment and Restoration Support

Standards and Assessment Section

July 2009

Executive Summary

Water quality and biological health of the Peace River and associated tributaries were assessed by the Florida Department of Environmental Protection (DEP) on January 30, 2008. Objectives of the study were to:

1) Sample selected streams in the Peace River Basin to potentially determine the causative pollutant for sites on the Total Maximum Daily Load (TMDL) list.
2) Determine existing water quality and biological health of selected tributaries in the Peace River basin including their effects on the Peace River.
3) Document existing environmental conditions in the Peace River basin to provide information relevant to future management decisions.



Payne Creek @ State Park- A Tributary to the Peace River.

According to the DEP TMDL program there are 7 tributaries in the Peace River Basin that are impaired for dissolved oxygen:

- West Wales Drainage Canal,
- Peace River Tributary Canal,
- Peace River Drainage Canal,
- Wahneta Farms Drainage Canal,
- Alligator Branch,
- Limestone Creek, and
- Prairie Creek.

Twenty study sites were assessed for a suite of water chemistry parameters and several measures of biological health. The majority of these sites fall within the newly-proposed Bone Valley nutrient region, created to capture areas of naturally high phosphorus. Four sites are within the Peninsula nutrient region. Sampling was conducted on the same day, by eight different sampling teams.

Several of the sites exceeded the Class III surface water quality standard of 1,275 µmhos/cm or no more than 50% above background levels, whichever is greater. Three sites exceeded this Class III water quality standard: Whidden Creek (1825 µmhos/cm), Hawthorne Creek (1300 µmhos/cm), and Hog Bay (1502 µmhos/cm). The pH of Joshua Creek (8.67 S.U.) was more than 1 unit above background levels, thus exceeding the Class III criteria. All other pH values complied with Class III criteria. At the time of this study, all twenty sites complied with the Class III water quality standard for dissolved oxygen (≥ 5.0 mg/L).

The Stream Condition Index scores for all but four sites were in the "Healthy" (40-67 points) or "Exceptional" (> 67 points) categories, indicating that much of the basin's macroinvertebrate communities are still intact. The Wahneta Farms Drainage Canal (33 points), Peace Canal at 91 Mine Rd. (36 points) Peace River at SR 60 (32 points), and Prairie Creek (19 points) scored in the "Impaired" category. Habitat Assessment scores ranged from a low of 45 points at Wahneta Farms Drainage Canal to a high of 137 points at Joshua Creek; 70% of the sites fell into the "sub-optimal" category (80 – 119 points).

Nutrient enrichment is of concern within the Peace River basin. Whidden Creek, Peace River at SR 64, and Hog Bay exceeded the proposed nitrate+nitrate Class III surface water quality standard for clear streams (0.35 mg/L). Nine additional sites had nitrate+nitrite values of greater than 0.35 mg/L, but these streams are not considered "clear" (< 40 PCU), therefore the criterion would not apply. Peace River at SR 60, Bowlegs Creek, Whidden Creek, Troublesome Creek, Hawthorne Creek, and Hog Bay all had total nitrogen values greater than the proposed reference site-based total nitrogen Class III water quality criterion of 1.73 mg/L. Elevated total phosphorus concentrations were also common; Peace Canal at 91 Mine Rd., Peace River at SR 60, Whidden Creek, Payne Creek at Hobb Rd., Payne Creek at State Park, Peace River at 664 A, Peace River at SR 64, Troublesome Creek, Oak Creek at Sweetwater Rd., and Charlie Creek at US 17 all had values greater than the applicable proposed reference site-based Class III water quality criteria (0.116 mg/L in the Peninsula nutrient region and 0.415 in the Bone Valley nutrient region).

Despite the elevated nutrient values found at the aforementioned sites, only two of these 13 sites that had nutrients above the reference site distribution also had failing Stream Condition Index scores. These sites were the Peace Canal at 91 Mine Rd. and Peace River at SR 60. For

sites where it can be shown that high nutrient levels can be assimilated into the ecosystem without negative biological impacts, site specific alternative criteria (SSACs) may be warranted. (It should be noted that a lack of adverse downstream effects would have to be demonstrated in order to establish SSACs. Downstream waters were not evaluated as part of this study.)

Background

The Peace River, a Class III water body, originates at the outflow of Lake Hancock near the town of Bartow in Polk County, Florida. The river flows generally southward for 105 miles before discharging into the Charlotte Harbor estuary. The major tributaries of the Peace River include Peace, Saddle, Horse, Charlie, and Shell Creeks.

Much of the Peace River basin is in the Bone Valley, an area rich in fossils and producing the richest and most accessible phosphate deposits in the world. Figure 1 shows the sites visited for this study in relation to the Peace River Formation and Bone Valley Member, geologic formations known to contain high amounts of phosphorus. Most of the sites selected for this study fall within the Bone Valley nutrient region, which was delineated to include waters that flow within or from these areas of high natural phosphorus. Four sites lie within the Peninsula nutrient region, just outside of the Bone Valley region. Total phosphorus concentrations in the Peace River basin are extremely high relative to other freshwater systems due to both natural deposits and the historic influences of mined lands.

Water quality in the basin may be affected by phosphate mining, wastewater and stormwater discharges, as well as agricultural and ranchland runoff. The principal land use in the watershed in 1999 was agriculture, making up 43.7 percent of the total area in the watershed (BPS&J 2007). Areas of urban and phosphate mining each increased from less than one percent of the watershed to approximately 10 percent of the watershed between the 1940s and 1999. Phosphate mining was originally concentrated in the upper basin near Bartow and Zolfo Springs but has since moved south into the Payne Creek and upper Horse Creek basins. Urbanized areas are largest in the northern portion of the watershed in Polk County near Bartow.

During the basin study, several tributaries were sampled to determine their biological status and characterize their influence on the water quality of the Peace River. Efforts were taken to minimize and assess non-water quality factors (*e.g.*, substrate diversity and abundance, stream morphology, and flow) that can impact the dissolved oxygen and biological health of streams.

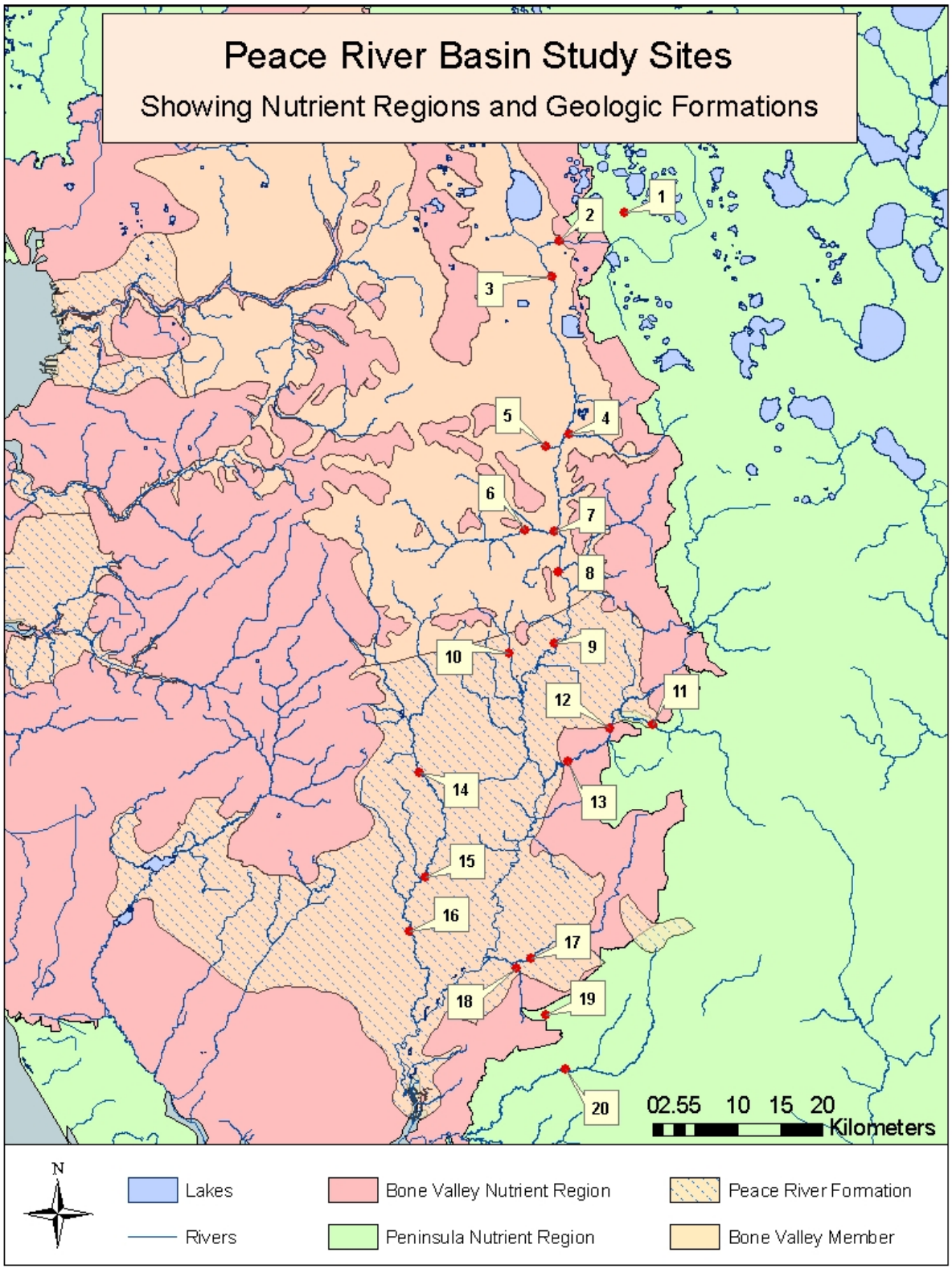


Figure 1: Most of the study sites fall within, or close to, the Bone Valley Nutrient Region.

Study Sites

A total of 20 sites were selected for inclusion in the study based on the hydrologic conditions at the time of the study and the available access. Three sites- Payne Creek at the State Park, Charlie Creek at Sweetwater Rd., and Horse Creek at County Road 72- were sampled by two different teams for quality control purposes (Table 1). An overview of all the sampling locations is shown in Figure 2. The 20 sites are broken into upper, middle, and lower groups for more detailed views in Figures 3, 4 and 5, respectively

Table 1: Site Assignments

District/Section	Site 1	Site 2	Site 3
Central District	Peace R @ SR 60	Peace Canal @ 91 Mine Rd	Wahneta Farms Drainage Canal
Southeast District	**Payne Ck @ State Park**	Whidden Ck @ Old Bowling Green Rd	Bowlegs Ck @ Mt Pisgah Rd
Environmental Assessment Section (TLH)	Payne Ck @ Hobb Rd	Peace R @ CR 664A	**Payne Ck @ State Park**
Northwest District	**Charlie Ck @ Sweetwater Rd**	Peace R @ SR 64	Troublesome Ck @ Dansby Rd
Biology Section (TLH)	Charlie Ck @ US 17	**Charlie Ck @ Sweetwater Rd**	Oak Ck @ Sweetwater Rd
Southwest District	**Horse Ck @ US 72**	Horse Ck @ US 70	Horse Ck @ 665
Northeast District	Hog Bay @ CR 763	Hawthorne Ck @ Reynolds Rd	**Horse Ck @ US 72**
South District	Prairie Ck @ Herbert Rd	Joshua Ck @ Airport Rd	Not Sampled

Duplicates are indicated in bold

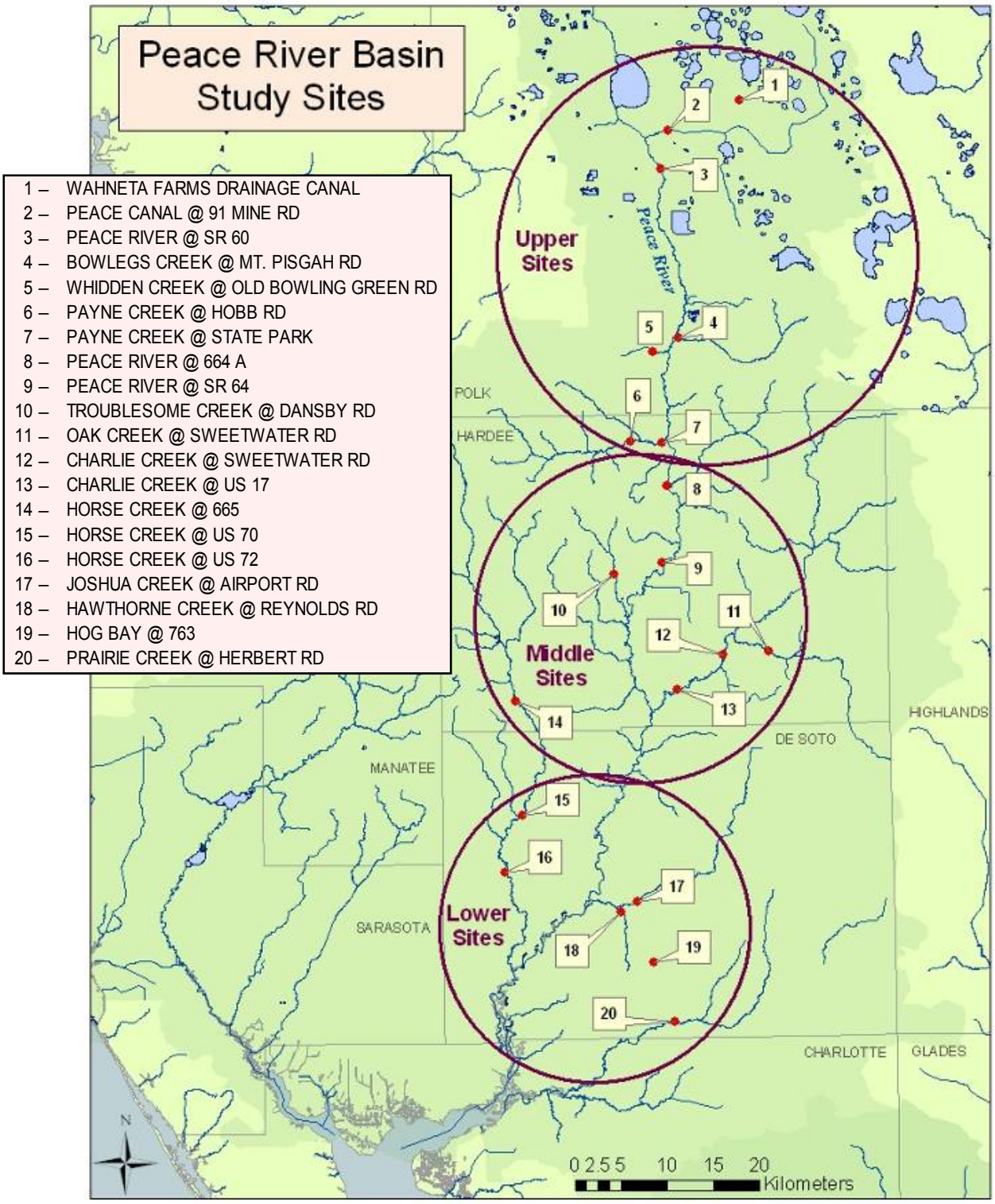


Figure 2: Locations of all 20 study sites. The Peace River Basin is shown in green.

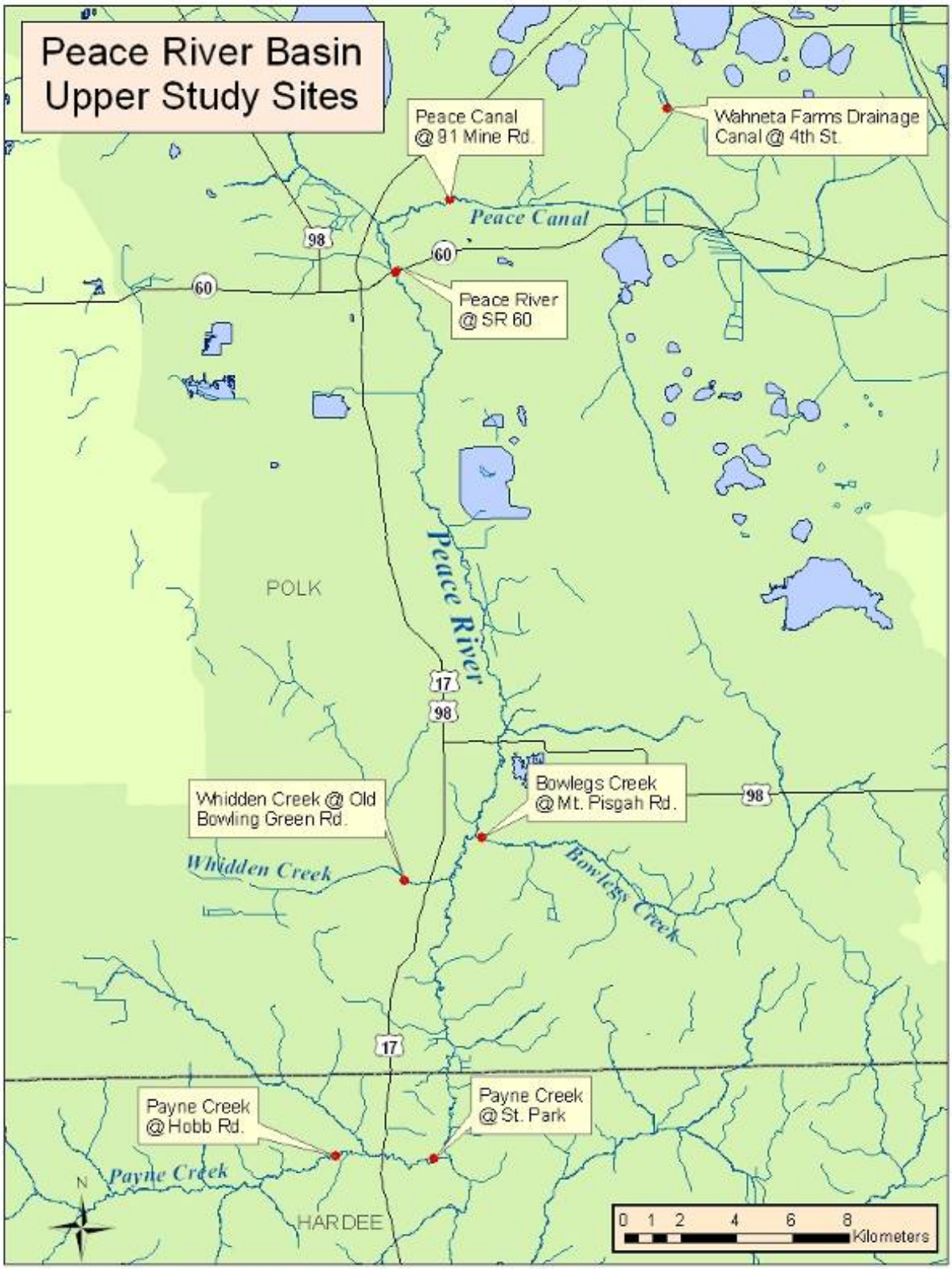


Figure 3: Close-up of Upper Peace River Basin Study Sites

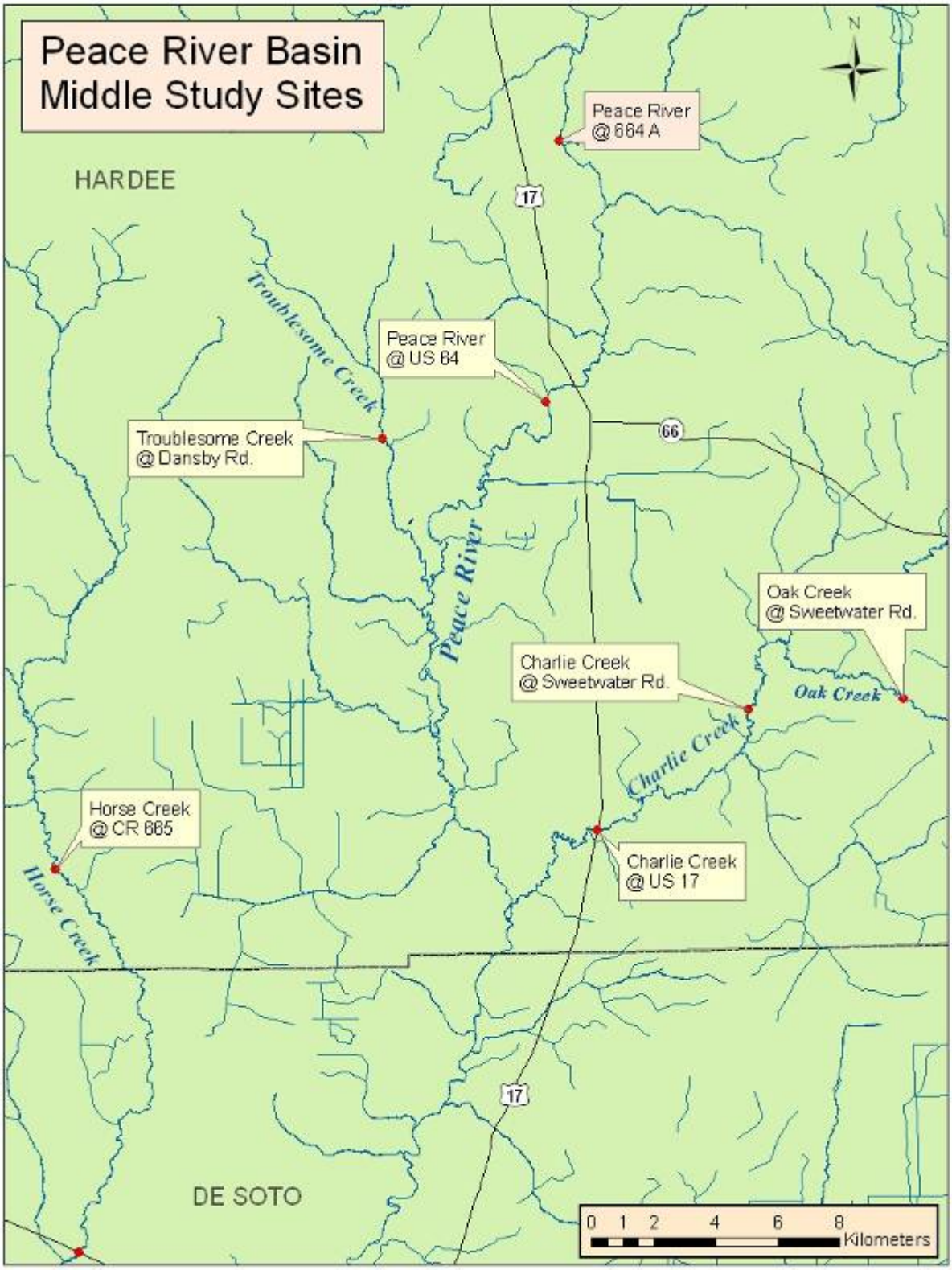


Figure 4: Close-up of Middle Peace River Basin Study Sites

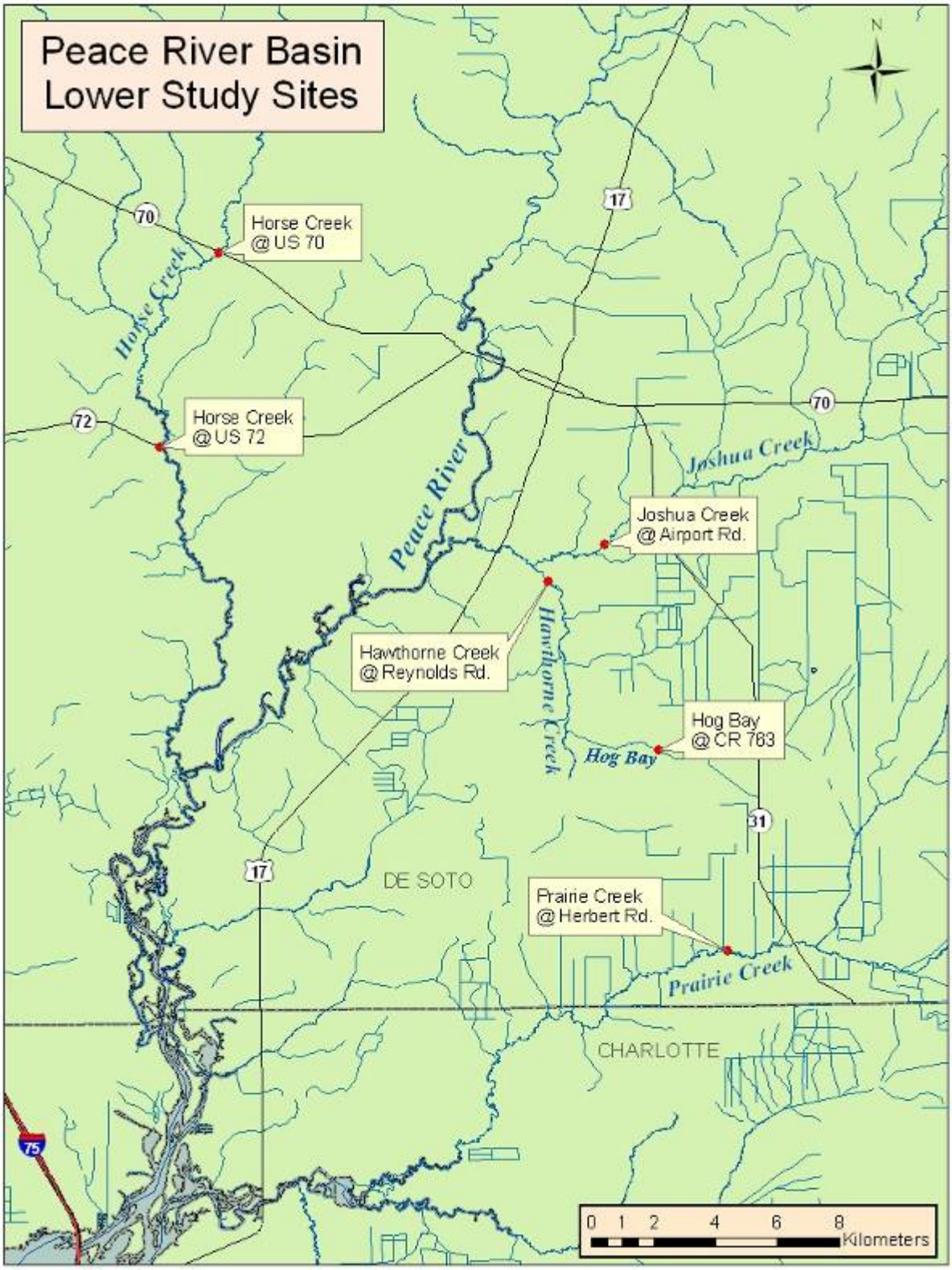


Figure 5: Close-up of Lower Peace River Basin Study Sites

Methods

All field and laboratory biological methods followed DEP Standard Operating Procedures (SOPs, see http://www.floridadep.org/labs/qa/sops.htm for details) and met DEP quality assurance/quality control standards (see http://www.floridadep.org/labs/qa/index.htm).

Water Quality Measurements

Water was sampled according to the DEP field SOP FS 2100, Surface Water Sampling, for all parameters. The direct grab technique was used to collect water directly into bottles. Water quality samples were collected for nutrients, turbidity, color, total suspended solids, chlorophyll *a*, phaeophytin *a*, and biochemical oxygen demand. The nutrient suite included analysis of total Kjeldahl nitrogen, ammonia, nitrate+nitrite, organic carbon, and total phosphorus.

Habitat Assessment

Habitat quality was assessed using method FT 3100, Stream and River Habitat Assessment. Maps of a 100 meter stretch of the stream or river are created using the Stream/River Habitat Sketch Sheet (FD9000-04) to locate and quantify coverage of the "major" productive habitats (roots, rock, aquatic vegetation, woody debris, and leaf material). Habitat Assessment, using form FD9000-05, evaluates eight attributes known to have potentially important effects on benthic macroinvertebrates: substrate diversity, substrate availability, water velocity, habitat smothering, artificial channelization, bank stability, riparian buffer zone width, and riparian vegetation quality. Twenty points are possible for each parameter. The total score is placed into one of four categories: Optimal (≥ 120), Suboptimal (81-119), Marginal (41-80), and Poor (≤ 40).

Hydrologic Score

Hydrologic modification was scored on a scale from 1-10, with 1 being optimal. Scores were based on observations of human influences on the stream watershed that negatively alter the flow regime. Degrading factors include impoundments, impervious surfaces throughout the watershed, water withdrawals, and ditching.

Macroinvertebrate Communities

Macroinvertebrate sampling was performed at all sites using the Stream Condition Index (SCI) methodology (FS 7420). The SCI procedure involves sampling productive habitats using

20 sweeps of a US 30 mesh D-framed dip net. The sweeps are apportioned across productive habitats identified during the Habitat Assessment (see above) leaving some sweeps to be taken in "minor" habitats (*e.g*., sand, silt). Macroinvertebrates are then sub-sampled in the laboratory, and identified to lowest practical taxonomic level.

Algal Communities

Periphyton community sampling was conducted at each of the sites. The Qualitative Periphyton Sampling method (FS 7220) consists of collecting algae found on natural substrates. Algae are collected from 10 separate "major" habitats, identified during the Habitat Assessment, and then combined together into one composite sample, which is subsequently enumerated and identified to the species level (where practical).

Additionally, the Rapid Periphyton Survey (RPS) (FS 7230) was conducted. The RPS is a modified version of the Rapid Habitat and Periphyton Assessment method developed by Stevenson *et al*. (2004) for EPA. In this method, 11 transects are established across the stream at 10 meter intervals. Each of the eleven transects are separated into nine observation points where algal presence, thickness, and type (filamentous or diatoms) are assessed, for a total of 99 sampling points per site.

Vegetative Communities

A Linear Stream Vegetation Survey of aquatic macrophytes was conducted at all of the sites. In this method, the 100 meter stretch is divided into ten sections from downstream to upstream. All plants in the water and up to an approximation of the mean high water mark are identified to genus or species level (when possible) for each section. If a particular species has extensive coverage, it is assigned dominance or co-dominance.

Results and Discussion

Water Quality

See Table 2 below for physical/ chemical water quality values from all sampled sites.

Nutrients

Many of the sites sampled within the Peace River basin had elevated nitrate+nitrite levels. A nitrate+nitrite surface water quality standard of 0.35 mg/L is currently being proposed for Florida clear streams (streams with color < 40 PCU); Whidden Creek, Peace River at 64, and Hog Bay would exceed this standard. Nine of the other sites had nitrate+nitrite values greater than 0.35 mg/L, but have a color higher than 40 PCU, therefore the proposed criteria would not apply.

Total nitrogen (TN) levels were elevated in many of the study sites. The Bone Valley and Peninsula nutrient regions have the same proposed TN water quality standard of 1.73 mg/L. Sites with TN values exceeding this criterion included Peace River at SR 60, Bowlegs Creek, Whidden Creek, Troublesome Creek, Hawthorne Creek, and Hog Bay. The Peace River at SR 60 had an exceptionally high TN value of 17.81 mg/L, ten-fold greater than the proposed criterion.

Total phosphorus (TP) concentrations were also high in many of the sampled sites. Most of the sites are located within the Bone Valley nutrient region, which is naturally high in phosphorus deposits, and therefore has a higher proposed water quality standard for TP (0.415 mg/L) than the other nutrient regions within the state. The TP values measured at Peace Canal at 91 Mine Rd., Peace River at SR 60, Whidden Creek, Payne Creek at Hobb Rd., both Payne Creek at State Park replicates, Peace River at 664 A, Peace River at SR 64, Troublesome Creek, and Charlie Creek at US 17 exceeded this proposed criterion. Of the four sites located within the Peninsula nutrient region, only Oak Creek at Sweetwater Rd. exceeded the proposed total phosphorus water quality standard of 0.116 mg/L.

Ammonia levels complied with surface water quality criteria for Class III water bodies (≤ 0.02 mg/L un-ionized ammonia) at all sites except for Peace River at SR 60. This site had a highly elevated ammonia concentration of 17 mg/L, and an un-ionized ammonia concentration of 0.074 mg/L, which exceeds the Class III un-ionized ammonia criterion.

Organic carbon values ranged from 6.8 - 35 mg/L among all the sites. The locations with the highest organic carbon concentrations included Horse Creek at US 70 (21 mg/L) and Horse Creek at CR 665 (35 mg/L). The lowest values occurred at Troublesome Creek (6.8 mg/L) and Whidden Creek (8.7 mg/L).

Physical/ Aggregate Properties

Concentrations of Total Suspended Solids (TSS) were below practical quantitation limits (PQLs) or method detection limits (MDLs) for all of the study sites except three: Troublesome Creek (19 mg/L), Oak Creek (41 mg/L), and Payne Creek at State Park (Duplicate) (24 mg/L). Turbidity values ranged from 8.2 to 0.35 NTU.

The highest color values were found at Horse Creek at US 70 (100 PCU) and Horse Creek at CR 665 (200 PCU). The lowest color values were from Peace River at SR 64 (30 PCU), Hog Bay (30 PCU), and Whidden Creek (20 PCU).

Biochemical Oxygen Demand

Biochemical Oxygen Demand (BOD) measures the amount of oxygen required by microorganisms to decompose the organic matter in a water sample. Five sites had BOD values greater than the PQL: Payne Creek at State Park (2.2 mg/L), Peace River at SR 60 (3.9 mg/L), Troublesome Creek (2.1 mg/L), Oak Creek (2.0 mg/L), and Hawthorne Creek (2.6 mg/L).

Chlorophyll

Proposed language for the Impaired Waters Rule (62-303) states that streams can be included on the planning list for nutrients if the annual mean chlorophyll *a* values exceed 20 µg/L. Only the Peace River at SR 60 (where low water velocity conditions prevailed) had a chlorophyll a value of greater than 20 µg/L (33 µg/L).

Physical/Chemical Measurements

Although there have been concerns with the dissolved oxygen levels at several of the sites in the Peace River basin, at the time of this study, all the study sites complied with the Class III water quality standard (greater than 5.0 mg/L).

Many sites had high specific conductivity readings. The criteria for Class III surface water quality states that specific conductance shall not be increased more than 50% above background levels, or to 1275, whichever is greater. Payne Creek at the State Park was determined to be minimally disturbed and was used to establish background conditions. The average conductivity at Payne Creek was 451 µmhos/cm, as measured by two independent sampling teams. Because 1275 µmhos/cm is greater than 50% above background (677 µmhos/cm), the standard defaulted to 1275 µmhos/cm. Sites that exceeded this standard included Whidden Creek (1825 µmhos/cm), Hawthorne Creek (1300 µmhos/cm), and Hog Bay (1502 µmhos/cm).

The pH value of 8.67 at Joshua Creek was more than 1 unit above background levels (average pH at Payne Creek @ State Park = 7.29 S.U.) and exceeds Class III criteria.

Table 2: Physical/Chemical Water Quality Values for Peace River Basin Sites

UPPER BASIN SITES COMPONENT	Wahneta Farms Drainage Canal	Peace Canal @ 91	Peace River @ 60	Bowlegs Creek	Whidden Creek	Payne Creek @ Hobb Rd	Payne Creek @ State Park	Payne Creek @ State Park (DUP)
Biochemical Oxygen Demand-5 Day (mg/L)	1.9 I	0.75 I	3.9	0.73 I	0.38 I	1.5 I	2.2	0.88 I
Chlorophyll-a, Corrected (ug/L)	1.2 I	2.2	33	1.2 I	2.9	0.84 I	0.58 I	4.3
Phaeophytin-a (ug/L)	0.62 I	2.8	7.2	0.81	4.1	0.38 I	0.4 I	5.5
Turbidity (NTU)	3.1	6.7	8.2	0.35	4.3	2.2	1.6	7.5 A
Color (PCU)	60	80	80 A	60	20	80	60	60
Total Suspended Solids (mg/L)	4 U	4 U	8 I	4 U	4 I	4 U	4 U	24
Ammonia-N (mg/L)	0.024	0.051	17	0.012 I	0.027	0.021	0.017 I	0.017 I
Nitrate+Nitrite-N (mg/L)	0.13	0.41	0.81	3.3	2.5	0.39	0.56	0.53
Total Kjeldahl Nitrogen (mg/L)	0.86	1.1	17	0.81	0.62 J	0.84	0.79	1.1
Organic Carbon (mg/L)	16	16	19	12	8.7	18	16	16
Total Phosphorus (mg/L)	0.042 I	0.43	3.7	0.12	3.8	0.55	0.61	0.73
Dissolved Oxygen (mg/L)	5.56	7.69	7.08	9.09	10.23	10.22	8.82	11.20
pH (SU)	7.2	7.7	7.1	7.45	7.76	7.40	7.76	6.81
Specific Conductance (umhos/cm)	181	451	1006	249	1825	436 J	446	455 J
Temperature (°C)	18.8	16.0	15.6	15.09	18.90	14.9	14.55	15.81

MIDDLE BASIN SITES COMPONENT	Peace River @ 664 A	Peace River @ 64	Troublesome Creek	Oak Creek @ Sweetwater Rd	Charlie Creek @ Sweetwater Rd	Charlie Creek @ Sweetwater Rd (DUP)	Charlie Creek @ 17	Horse Creek @ 665
Biochemical Oxygen Demand-5 Day (mg/L)	0.75 I	0.94 I	2.1	2.0	0.93 I	1.1 I	0.35 I	0.31 I
Chlorophyll-a, Corrected (ug/L)	1.3 I	0.95 I	2.5 A	0.55 U	0.62 I	2.2	2	1.7 I
Phaeophytin-a (ug/L)	2.2	0.51 I	1.9 A	0.37 I	0.53 I	2.1	2.1	0.33 I
Turbidity (NTU)	1.7	1.4	7.1 A	3.4	1.6 A	3.6	2.7	1.9
Color (PCU)	50	30 A	80	80 A	60 A	80 A	60	200
Total Suspended Solids (mg/L)	4 U	4 U	19	41	4 U	5 I	4 I	4 U
Ammonia-N (mg/L)	0.019 I	0.024	0.042	0.024	0.033	0.031	0.021	0.013 I
Nitrate+Nitrite-N (mg/L)	0.99	0.91	3.3	0.26	0.18	0.22	0.14	0.005 I
Total Kjeldahl Nitrogen (mg/L)	0.68	0.65	0.99	0.81	0.72	0.82	0.77	1.4
Total Nitrogen (mg/L)	1.67	1.56	4.29	1.07	0.9	1.04	0.91	1.41
Organic Carbon (mg/L)	12	12	6.8	16	14	14	14	35
Total Phosphorus (mg/L)	1.7	2.0	0.73	0.32	0.32	0.38	0.44	0.25
Dissolved Oxygen (mg/L)	9.68	12.51	9.26	19.5 J	18.3 J	10.64	19.6 J	11.0
pH (SU)	7.85	8.30	7.3	6.68	7.4	7.72	6.6	6.7
Specific Conductance (umhos/cm)	925 J	869	391	480	458	447	454	317
Temperature (°C)	15.12	18.32	14.09	15.34	22.1	20.99	17.0	16.2

LOWER BASIN SITES	Horse Creek	Horse Creek	Horse Creek	Joshua	Hawthorne	Hog Bay	Prairie
COMPONENT	@ 70	@ 72	@ 72 (DUP)	Creek	Creek		Creek
Biochemical Oxygen Demand-5 Day (mg/L)	1.8 I	0.2 U	0.6 I	0.75 I	2.6	0.6 I	1.1 I
Chlorophyll-a, Corrected (ug/L)	0.64 I	0.55 U	0.74 I	1.2 I	11	0.87 I	1.8
Phaeophytin-a (ug/L)	0.24 U	0.33 I	0.24 U	0.24 U	7	0.55 I	1.3
Turbidity (NTU)	1.5	1.0	1.1	0.8	3.6 A	1.8	2.9
Color (PCU)	100	60	60	50	50	30	50
Total Suspended Solids (mg/L)	4 U	4 U	4 U	4 U	5 I	4 U	4 I
Ammonia-N (mg/L)	0.012 I	0.015 I	0.016 I	0.018 I	0.012 I	0.016 I	0.015 I
Nitrate+Nitrite-N (mg/L)	0.007 I	0.7	0.68	0.19	0.59	0.94	0.008 I
Total Kjeldahl Nitrogen (mg/L)	0.76	0.71	0.72	0.67	1.2	0.86	0.9
Organic Carbon (mg/L)	21	15	15	12	11	10	13
Total Phosphorus (mg/L)	0.30	0.35	0.36	0.16	0.11	0.036 I	0.022 I
Dissolved Oxygen (mg/L)	11.8	7.96	15.09	13.76 J	9.65	8.84	10.73 J
pH (SU)	6.3	6.85	7.72	8.67	7.48	7.38	7.95
Specific Conductance (umhos/cm)	625	737	729	616	1300	1502	832
Temperature (°C)	16.1	15.25	19.64	19.39	15.62	18.50	17.51

"U"= Below Method Detection Limit; "I"= Below Practical Quantitation Limit; "A"= Value reported is the mean of two or more determinations; "J"= Estimated value

Habitat Assessment

The majority of the Peace River basin sites had Habitat Assessment scores in the "Suboptimal" or "Optimal" ranges. Five sites were given scores in the "Marginal" range: Wahneta Farms Drainage Canal (45), Peace Canal at 91 Mine Rd. (58), Charlie Creek at Sweetwater Rd. (Duplicate) (55), Horse Creek at US 72 (71), and Hog Bay (78) (Figure 6).

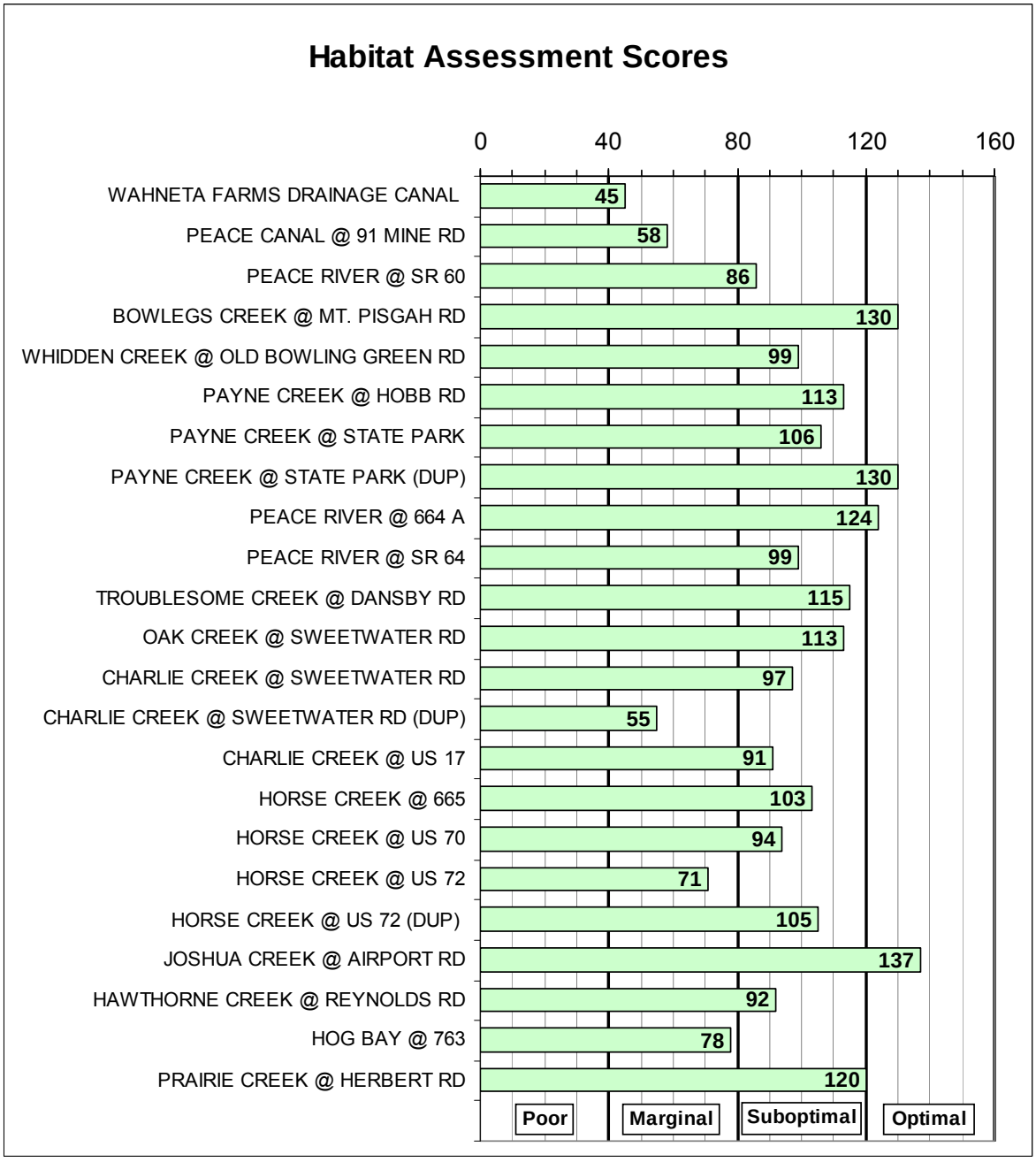


Figure 6: Habitat Assessment Scores

Hydrologic Score

Sites that received a “Poor” hydrologic score (7-8), indicating a highly altered flow regime, included Wahneta Farms Drainage Canal, Peace Canal at 91 Mine Rd., and Charlie Creek at Sweetwater Rd. (Duplicate). No sites received a “Very poor” (9-10) score. (See Table 3 below.)

Table 3: Hydrologic Scores

	Hydrologic Score	Category
WAHNETA FARMS DRAINAGE CANAL	8	Poor
PEACE CANAL @ 91 MINE RD	7	Poor
PEACE RIVER @ SR 60	5	Moderate
BOWLEGS CREEK @ MT. PISGAH RD	2	Best
WHIDDEN CREEK @ OLD BOWLING GREEN RD	3	Good
PAYNE CREEK @ HOBB RD	4	Good
PAYNE CREEK @ STATE PARK	2	Best
PAYNE CREEK @ STATE PARK (DUPLICATE)	4	Good
PEACE RIVER @ 664 A	6	Moderate
PEACE RIVER @ SR 64	5	Moderate
TROUBLESOME CREEK @ DANSBY RD	5	Moderate
OAK CREEK @ SWEETWATER RD	3	Good
CHARLIE CREEK @ SWEETWATER RD	4	Good
CHARLIE CREEK @ SWEETWATER RD (DUPLICATE)	7	Poor
CHARLIE CREEK @ US 17	4	Good
HORSE CREEK @ 665	No data	–
HORSE CREEK @ US 70	3.5	Good
HORSE CREEK @ US 72	4	Good
HORSE CREEK @ US 72 (DUPLICATE)	3.5	Good
JOSHUA CREEK @ AIRPORT RD	4.5	Good-Moderate
HAWTHORNE CREEK @ REYNOLDS RD	4	Good
HOG BAY @ 763	6	Moderate
PRAIRIE CREEK @ HERBERT RD	4	Good

Macroinvertebrate Communities

The Stream Condition Index scores for all but four sites were in the “Healthy” (40-67 points) or “Exceptional” (68-100 points) categories The Wahneta Farms Drainage Canal (33 points), Peace Canal at 91 Mine Rd. (36 points), Peace River at SR 60 (32 points), and Prairie Creek (19 points) scored in the “Impaired” category. (See Figure 7 below for all SCI scores, Appendix A for a breakdown of the SCI scores, and Appendix D for taxa lists of all identified species from each site.)

The Habitat Assessment score (45 points) at Wahneta Farms Drainage Canal placed it in the bottom of the “marginal” category with only one available productive habitat (aquatic vegetation) due to severe silt smothering. Anaerobic sediments were noted and although dissolved oxygen during the current survey (5.56 mg/L) was above the Class III water quality standard, this site is on the TMDL list for impaired dissolved oxygen. Episodic levels of low dissolved oxygen may be responsible for this site failing to meet its designated use.

The Peace Canal at 91 Mine Rd. had a Habitat Assessment score of 58, which is in the “marginal” category. Lack of available productive habitat, habitat smothering, and hydrologic modification were the likely drivers of the low SCI score.

An elevated un-ionized ammonia concentration at Peace River @ 60 (0.074 mg/L) was above the Class III water quality standard (< 0.02 mg/L) and may be responsible for the impairment to the macroinvertebrate community at this site.

There is no obvious source of impairment at the Prairie Creek. The habitat assessment score was in the “optimal” range and the dissolved oxygen was estimated to be 10.73 mg/L. While the conductivity (832 umhos/cm) was greater than 50% over background (Payne Creek @ State Park ~ 450 umhos/cm), it was less than several other sites in the basin (Whidden Creek, Hawthorne Creek, and Hog Bay) with SCI scores in the “healthy” range. However, in the “Peace River Cumulative Impact Study” report (PBS&J 2007), it was noted that increased flows from agricultural discharges in Prairie Creek have resulted in “comparatively large historic increases in levels of measured conductivity in Prairie Creek...”

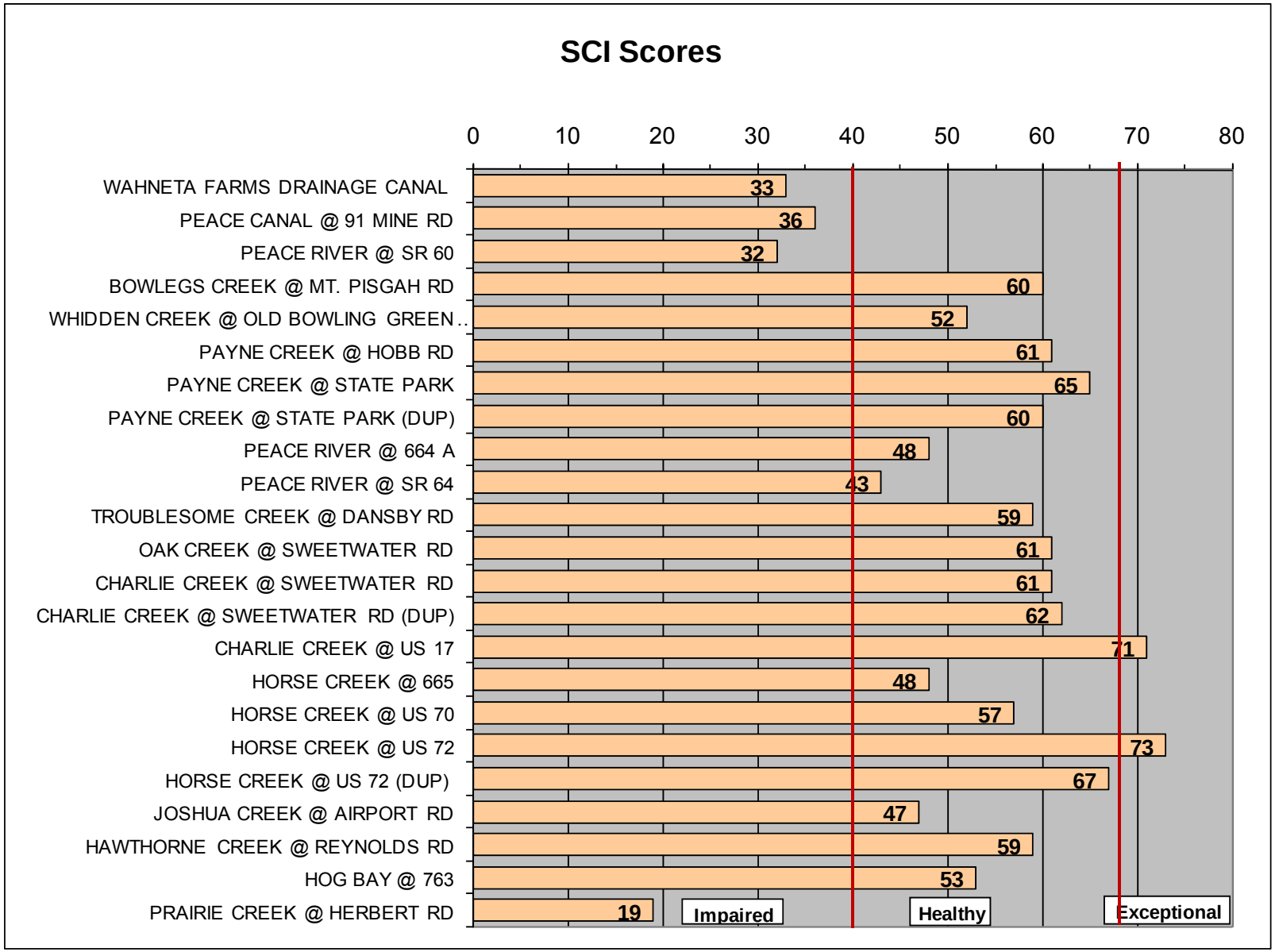
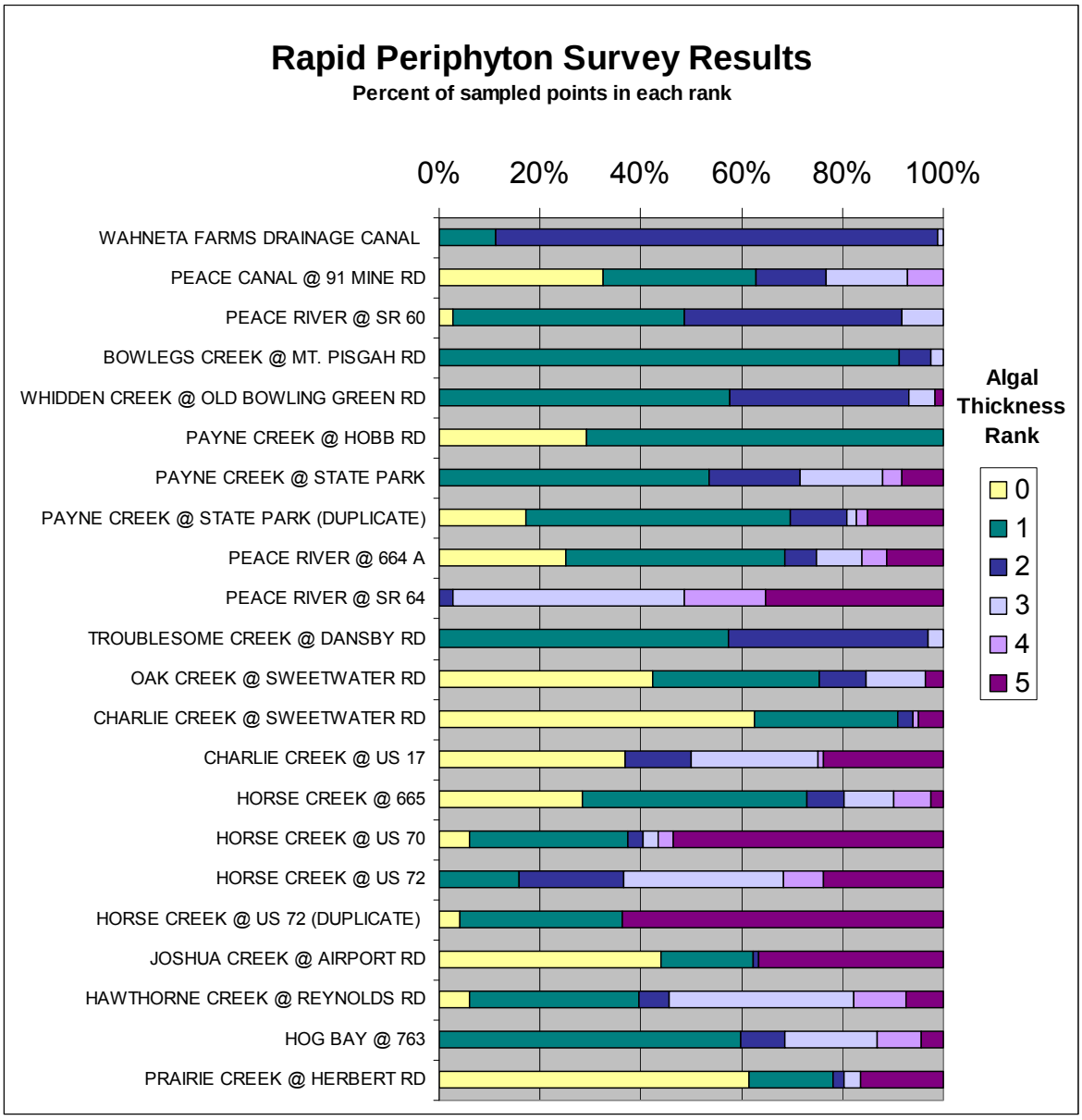


Figure 7: Stream Condition Index Scores

Algal Communities

Rapid Periphyton Survey

The Rapid Periphyton Survey results indicate that long, filamentous algae were most prevalent at the following sites: Peace River at SR 64, Charlie Creek at US 17, Horse Creek at US 70, Horse Creek at US 72 (Duplicate), and Joshua Creek. (See Figure 8 below)



Algal Thickness Ranks

0	1	2	3	4	5
0 mm, rough	<0.5 mm or slimy	0.5-1 mm	>1 to <6 mm	6-20 mm	>20 mm

Figure 8: Rapid Periphyton Survey Results

Qualitative Periphyton Sampling

Bacillariophyta (diatoms) was the dominant algal phylum at all of the sites. Both *Chlorophycota* (green algae) and *Cyanophycota* (blue-green algae) were found in smaller percentages at all of the sites. *Euglenophycota* made up a small (< 2) percentage of algal taxa at five sites. (See Table 4 below for summary results, and Appendix B for a list of algal taxa.)

Table 4: Qualitative Periphyton Sampling Results

	% Bacillariophyta	% Chlorophycota	% Cyanophycota	% Euglenophycota	# Diatom Taxa	Dominant Diatom Taxon	Dominant Diatom %	# Wet Taxa	Dominant Wet Algae Taxon	Dominant Wet Algae %
WAHNETA FARMS DRAINAGE CANAL	83.39	4.32	12.29	0	44	Nitzschia	18	14	Jaaginema	44
PEACE CANAL @ 91 MINE RD	92.13	2.95	4.92	0	48	Achnanthes exigua	18.96	16	Jaaginema	20.83
PEACE RIVER @ SR 60	61.44	18.3	18.95	1.31	44	Nitzschia	30.28	30	Chlorella	22.03
BOWLEGS CREEK @ MT. PISGAH RD	91.29	2.9	5.81	0	41	Nitzschia	13.6	9	Synechocystis	33.33
WHIDDEN CREEK @ OLD BOWLING GREEN RD	85.81	3.96	10.23	0	50	Nitzschia	23.55	11	Synechocystis	34.88
PAYNE CREEK @ HOBB RD	83.99	1.63	14.38	0	45	Cocconeis placentula	15.97	11	Jaaginema	32.65
PAYNE CREEK @ STATE PARK	91.56	2.6	5.52	0	41	Achnanthes lanceolata	15	14	Jaaginema	26.92
PAYNE CREEK @ STATE PARK (DUP)	87.42	2.9	9.68	0	38	Achnanthes	15.34	11	Synechocystis	28.21
PEACE RIVER @ 664 A	87.62	3.58	8.79	0	37	Nitzschia	24.8	10	Jaaginema	23.68
PEACE RIVER @ SR 64	61.44	18.3	18.95	1.31	44	Nitzschia	30.28	30	Chlorella	22.03
TROUBLESOME CREEK @ DANSBY RD	80.86	2.97	15.84	0	40	Achnanthes	17.8	12	Jaaginema	43.1
OAK CREEK @ SWEETWATER RD	91.83	1.96	5.88	0.33	43	Cocconeis fluviatilis	35.2	10	Jaaginema	28
CHARLIE CREEK @ SWEETWATER RD	93.14	2.61	4.25	0	26	Fragilariaceae	15.4	10	Jaaginema	23.81
CHARLIE CREEK @ SWEETWATER RD (DUP)	88.2	2.62	9.18	0	34	Fragilariaceae	27.2	8	Jaaginema	44.44
CHARLIE CREEK @ US 17	86.89	1.97	11.15	0	35	Nitzschia	25.55	12	Synechocystis	32.5
HORSE CREEK @ 665	72.46	15.08	11.48	0.98	48	Fragilariaceae	25	20	Scenedesmus quadricauda	23.81
HORSE CREEK @ US 70	88	2.67	9.33	0	42	Fragilariaceae	20.4	12	calcicola	33.33
HORSE CREEK @ US 72	90.79	2.63	6.58	0	30	Achnanthes	14.4	12	Jaaginema	42.86
HORSE CREEK @ US 72 (DUP)	89.51	3.28	7.21	0	37	Nitzschia	14.2	8	calcicola	31.25
JOSHUA CREEK @ AIRPORT RD	96.72	0.66	2.62	0	41	Navicula	18.6	4	a	50
HAWTHORNE CREEK @ REYNOLDS RD	81.31	9.51	9.18	0	50	Navicula	13.6	12	Selenastrum	36.84
HOG BAY @ 763	84.26	1.64	13.44	0.33	51	Navicula	13.6	12	Jaaginema	47.92
PRAIRIE CREEK @ HERBERT RD	94.74	2.96	2.3	0	41	Fragilariaceae	15.17	8	Jaaginema	25

Vegetative Communities

The most common species found during the Linear Stream Vegetation Surveys was the invasive exotic *Alternanthera philoxeroides* (alligator weed), which was identified in 16 out of 23 sites. Other commonly identified exotic species included *Brachiaria mutica* (paragrass) (dominant in 4 sites), *Pistia stratioides* (water lettuce) (found in 6 sites), and *Hydrilla verticillata* (found at 7 sites). Common native vegetation included *Hydrocotyl* species (water pennywort) (found at 19 sites), *Lemna minor* (duckweed) (found at 9 sites), *Ludwigia repens* (red ludwigia) (identified at 12 sites), *Mikania scandens* (climbing hempvine) (found at 13 sites), and *Polygonum hydropiperoides* (smartweed) (found at 9 sites). The most common woody species was *Salix caroliniana* (Carolina willow), which was identified at 8 sites. (See Appendix C for a list of all identified plant species in each site.)

Conclusions

Water quality and biological health in the Peace River and several of its tributaries were assessed by multiple teams in January 2008. Three sites (Whidden Creek, Hawthorne Creek, and Hog Bay Creek) exceeded the Class III surface water quality standard for conductivity (≤1,275 µmhos/cm). One site, Joshua Creek, failed to comply with the Class III pH standard and Peace River at SR 60 exceeded the un-ionized ammonia criteria. Four different sites (Wahneta Farms Drainage Canal, Peace Canal at 91 Mine Rd., Peace River at SR 60, and Prairie Creek) received SCI scores indicative of impaired macroinvertebrate communities.

Of concern in the Peace River basin is nutrient enrichment, with 13 out of twenty sites exceeding the proposed criteria for total nitrogen, total phosphorus, and/or nitrate+nitrite. Despite this fact, only two of these ten sites (Peace Canal at 91 Mine Rd., and Peace River at SR 60) also had failing SCI scores, indicating that ecosystems within this region may be able to assimilate high levels of nutrients with no adverse biological impacts. Therefore, site specific alternative criteria may be appropriate for streams that exceed the water quality standards but have healthy biological communities, if it can also be demonstrated that downstream waters are not impacted.

References

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.

APPENDIX A

Macroinvertebrate Community Statistics

Benthic Macroinvertebrate Statistics Upper Sites	Wahneta Farms Drainage Canal		Peace Canal @ 91		Peace River @ 60		Bowlegs Creek		Whidden Creek		Payne Creek @ Hobb Rd		Payne Creek @ State Park		Payne Creek @ State Park (Dup)	
Summary Statistics																
Stream Condition Index 2007 (value)	33 A		36 A		32 A		60 A		52 A		61 A		65 A		60 A	
Stream Condition Index 2007 (category) *	Category III, Impaired		Category II, Healthy		Category III, Impaired		Category II, Healthy		Category II, Healthy		Category II, Healthy		Category II, Healthy		Category II, Healthy	
Stream Condition Index Metrics	Rep 1	Rep 2	Rep 1	Rep 2	Rep 1	Rep 2	Rep 1	Rep 2	Rep 1	Rep 2	Rep 1	Rep 2	Rep 1	Rep 2	Rep 1	Rep 2
Number of Total Taxa	22	23	23	25	31	33	38	41	22	23	31	37	47	40	36	38
Number of Ephemeroptera Taxa	2	2	2	2	2	2	2	1	2	3	4	5	7	3	3	5
Number of Trichoptera Taxa	2	1	2	2	0	0	4	3	4	5	3	6	4	4	4	3
Number of Clinger Taxa	2	1	0	2	0	0	4	4	6	6	5	5	6	3	3	3
Number of Long-lived Taxa	1	0	0	0	1	1	0	0	0	1	1	2	1	1	1	1
Number of Sensitive Taxa	0	0	0	0	0	0	3	3	2	3	3	2	4	1	2	1
Percent of Dominant Taxon	30.9	29.8	18.1	17.9	16.7	17.9	34.9	30.6	30.6	27.3	15.7	14.3	14.5	9.6	17.1	19.6
Percent Suspension Feeders and Filterers	9.1	7.0	9.1	9.3	5.7	6.2	31.6	32.5	15.3	20.5	10.9	5.4	9.5	12.7	19.2	19.3
Percent of Tanytarsini Individuals	13.4	12.6	18.1	17.2	6.0	5.5	61.2	60.6	0.7	0.7	4.8	5.7	13.8	17.8	16.4	17.6
Percent of Very Tolerant Individuals	20.1	17.2	23.8	29.0	44.7	37.9	5.3	6.9	0.0	0.7	15.0	11.4	13.8	15.3	16.4	13.5
Total Number of Individuals	149	151	160	145	150	145	152	160	147	154	147	140	152	157	146	148
Community Composition: Percent of total																
Dominant Taxon (name)	Hyalella azteca	Hyalella azteca	Caenis	Caenis	Pyrgophorus platyrachis	Polypedilum illinoense grp.	Tanytarsus sp. c epler	Tanytarsus sp. c epler	Stenelmis	Stenelmis	Polypedilum flavum	Polypedilum flavum	Hyalella azteca	Polypedilum flavum	Polypedilum flavum	Polypedilum flavum
Amphipoda	30.9	29.8	10.0	7.6	6.0	13.1	0.0	1.3	0.7	0.7	8.8	5.0	14.5	7.6	4.1	6.1
Coleoptera	0.0	0.0	0.0	0.7	0.7	3.5	7.2	5.0	36.1	29.9	14.3	12.1	11.8	19.8	13.0	6.8
Decapoda	0.7	0.0	0.0	0.0	2.0	4.1	0.0	0.0	0.0	0.0	0.0	0.7	0.7	0.0	0.0	0.0
Diptera	31.5	36.4	41.3	35.9	32.7	41.4	82.2	86.3	42.9	40.9	34.7	35.0	55.3	52.9	52.7	56.8
Ephemeroptera	25.5	25.2	20.6	20.7	16.0	17.9	2.0	0.6	2.0	7.1	11.6	12.9	9.2	4.5	6.2	8.1
Gastropoda	2.0	0.7	26.3	29.0	29.3	11.0	1.3	1.9	8.2	7.8	12.2	9.3	0.7	5.1	8.2	8.1
Odonata	3.4	3.3	0.0	3.5	8.7	2.8	0.7	0.6	0.7	0.0	10.9	17.1	2.6	1.9	3.4	2.7
Oligochaeta	4.0	4.0	0.0	0.7	1.3	2.8	0.0	0.6	0.0	0.0	0.0	0.7	0.0	0.6	3.4	0.0
Pelecypoda	0.0	0.0	0.0	0.7	2.0	2.8	0.0	0.0	0.0	1.3	2.0	0.7	0.0	1.3	4.8	6.8
Trichoptera	2.0	0.7	1.3	1.4	0.0	0.0	4.6	2.5	9.5	12.3	5.4	5.7	4.6	5.7	4.1	3.4
Trombidiformes	0.0	0.0	0.6	0.0	0.0	0.0	0.7	1.3	0.0	0.0	0.0	0.0	0.7	0.0	0.0	0.0
Functional Feeding Groups: Percent of total																
Browser-Grazers	0.0	0.0	0.0	0.0	1.0	2.1	0.0	0.0	0.0	0.0	0.0	0.4	0.3	0.0	0.0	0.0
Burrowing Deposit Feeders	4.0	4.0	0.0	0.7	1.3	2.8	0.0	0.6	0.0	0.0	0.0	0.7	0.0	0.6	3.4	0.0
Piercers	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	4.8	4.6	0.7	1.4	2.0	1.3	0.3	0.7
Predators	5.4	6.3	4.4	5.9	14.3	6.9	5.3	5.3	3.4	2.9	10.9	18.6	12.8	7.3	7.2	10.5
Scavengers	0.3	0.0	0.0	0.0	1.0	2.1	0.0	0.0	0.0	0.0	0.0	0.4	0.3	0.0	0.0	0.0
Scrapers	14.8	13.3	35.3	38.6	37.3	18.6	6.6	5.6	20.4	17.2	23.8	19.3	7.9	15.9	16.8	13.2
Shredders	21.8	20.5	10.9	8.6	8.7	17.9	5.9	9.1	13.3	12.7	17.7	17.5	16.8	15.0	14.4	17.9
Surface Deposit Feeders	44.6	49.0	40.3	35.9	26.0	37.9	49.3	46.9	42.2	42.2	36.1	34.6	50.3	47.1	38.7	36.5
Suspension Feeders	9.1	7.0	9.1	9.3	5.7	6.2	31.6	32.5	15.3	20.5	10.9	5.4	9.5	12.7	19.2	19.3
Unknown	0.0	0.0	0.0	0.0	4.7	5.5	1.3	0.0	0.7	0.0	0.0	1.4	0.0	0.0	0.0	2.0

Benthic Macroinvertebrate Statistics Middle Sites	Peace River @ 664 A		Peace River @ 64		Troublesome Creek		Oak Creek @ Sweetwater		Charlie Creek @ Sweetwater		Charlie Creek @ Sweetwater (Duplicate)		Charlie Creek @17		Horse Creek @ 665	
Summary Statistics																
Stream Condition Index 2007 (value)	48 A		43 A		59 A		61 A		61 A		62 A		71 A		48 A	
Stream Condition Index 2007 (category) *	Category II, Healthy		Category II, Healthy		Category II, Healthy		Category II, Healthy		Category II, Healthy		Category II, Healthy		Category I, Exceptional		Category II, Healthy	
Stream Condition Index Metrics	Rep 1	Rep 2	Rep 1	Rep 2	Rep 1	Rep 2	Rep 1	Rep 2	Rep 1	Rep 2	Rep 1	Rep 2	Rep 1	Rep 2	Rep 1	Rep 2
Number of Total Taxa	27	30	37	37	31	35	42	36	21	24	22	27	41	43	35	36
Number of Ephemeroptera Taxa	3	4	4	3	1	3	4	2	4	5	4	5	7	5	2	3
Number of Trichoptera Taxa	4	5	2	0	5	6	2	2	2	4	4	2	4	5	1	0
Number of Clinger Taxa	5	4	1	1	5	7	6	5	5	5	5	5	5	5	1	3
Number of Long-lived Taxa	1	1	1	1	1	1	2	2	1	0	1	2	2	1	2	2
Number of Sensitive Taxa	2	1	1	1	2	4	2	1	3	4	5	4	4	2	0	0
Percent of Dominant Taxon	15.1	15.1	21.4	16.9	26.9	26.2	9.4	21.3	17.0	21.9	23.2	26.5	12.9	11.4	25.4	27.5
Percent Suspension Feeders and Filterers	15.1	12.9	8.4	9.5	15.9	15.5	13.1	10.7	36.1	35.0	40.3	39.4	19.3	15.8	10.6	12.0
Percent of Tanytarsini Individuals	0.6	0.0	3.9	7.4	3.5	2.1	12.5	12.7	1.4	1.3	0.7	0.7	14.3	12.1	23.9	18.3
Percent of Very Tolerant Individuals	27.7	24.5	33.8	31.1	2.1	2.1	11.9	9.3	2.0	0.6	1.9	7.1	14.3	26.9	9.2	11.3
Total Number of Individuals	159	159	154	148	145	145	160	150	147	160	155	155	140	149	142	142
Community Composition: Percent of total																
Dominant Taxon (name)	Dicrotendipes neomodestus	Dicrotendipes neomodestus	Polypedilum illinoense grp.	Polypedilum illinoense grp.	Microcylloepus pusillus	Microcylloepus pusillus	Polypedilum flavum	Stenelmis	Hydropsyche	Hydropsyche	Hydropsyche	Hydropsyche	Stenelmis	Stenelmis/ Dicrotendipes neomodestus	Caenis	Caenis
Amphipoda	6.3	4.4	2.0	3.4	0.7	0.0	8.1	1.3	4.1	5.0	7.1	11.0	3.6	6.0	14.8	16.9
Coleoptera	3.8	2.5	4.6	6.8	37.9	42.8	10.0	26.0	9.5	11.3	2.6	5.2	14.3	12.8	2.1	2.8
Decapoda	0.6	0.0	0.0	0.0	0.0	0.0	1.9	0.7	0.0	0.0	0.0	0.7	0.0	0.0	4.9	0.7
Diptera	23.9	27.7	69.5	70.3	31.0	21.4	42.5	55.3	11.6	10.6	16.8	19.4	48.6	50.3	38.0	34.5
Ephemeroptera	25.8	31.5	11.0	10.1	0.7	4.8	13.8	4.0	34.7	33.1	24.5	19.4	9.3	9.4	28.2	33.1
Gastropoda	18.2	10.7	3.9	2.0	8.3	9.0	12.5	1.3	2.0	1.3	2.6	3.2	9.3	11.4	1.4	1.4
Odonata	3.8	5.7	1.3	0.0	0.7	2.1	4.4	2.0	2.7	1.9	1.3	1.9	0.7	0.7	4.2	1.4
Oligochaeta	0.6	0.0	1.3	2.0	2.1	0.0	0.0	2.0	0.0	0.6	1.3	1.9	0.7	0.7	2.8	4.9
Pelecypoda	0.0	0.6	3.3	2.7	3.5	4.1	3.1	0.7	0.7	0.0	3.2	3.2	5.7	3.4	0.0	2.1
Trichoptera	17.0	16.4	2.6	0.0	13.1	15.2	1.3	5.3	33.3	34.4	36.8	32.3	5.0	4.0	0.7	0.0
Trombidiformes	0.0	0.0	0.0	0.0	0.0	0.0	1.9	0.0	0.0	0.6	0.0	0.0	0.7	0.0	1.4	1.4
Functional Feeding Groups: Percent of total																
Browser-Grazers	0.3	0.0	0.0	0.0	0.0	0.0	0.9	0.3	0.0	0.0	0.0	0.0	0.0	0.0	2.5	0.4
Burrowing Deposit Feeders	0.6	0.0	1.3	2.0	2.1	0.0	0.0	2.0	0.0	0.6	1.3	1.9	0.7	0.7	2.8	4.9
Piercers	9.4	9.4	0.0	0.0	2.1	2.1	0.0	0.0	0.0	0.0	0.0	0.0	0.4	1.3	0.4	0.4
Predators	5.4	9.4	12.3	12.2	1.7	4.1	15.0	15.3	4.4	4.4	6.1	5.2	6.4	5.7	10.2	6.0
Scavengers	0.3	0.0	0.0	0.0	0.0	0.0	1.6	0.3	0.0	0.0	0.0	0.3	0.0	0.0	2.5	0.4
Scrapers	24.8	20.1	6.8	7.1	20.7	28.6	19.7	16.7	23.8	21.6	12.9	15.2	14.6	20.1	14.1	15.5
Shredders	5.4	5.0	17.5	15.2	14.1	9.3	17.2	16.0	6.5	7.5	11.3	12.6	8.6	9.1	12.3	14.4
Surface Deposit Feeders	35.5	39.9	51.6	51.4	42.8	40.3	31.9	38.7	29.3	30.9	28.1	25.5	48.6	47.3	41.9	43.3
Suspension Feeders	15.1	12.9	8.4	9.5	15.9	15.5	13.1	10.7	36.1	35.0	40.3	39.4	19.3	15.8	10.6	12.0
Unknown	3.1	3.1	2.0	2.0	0.0	0.0	0.6	0.0	0.0	0.0	0.0	0.0	1.4	0.0	2.8	2.8

Benthic Macroinvertebrate Statistics Lower Sites	Horse Creek @ 70		Horse Creek @ 72		Horse Creek @ 72 (Duplicate)		Joshua Creek		Hawthorne Creek		Hog Bay		Prairie Creek	
Summary Statistics														
Stream Condition Index 2007 (value)	57 A		73 A		67 A		47 A		59 A		53 A		19 A	
Stream Condition Index 2007 (category) *	Category II, Healthy		Category I, Exceptional		Category II, Healthy		Category II, Healthy		Category II, Healthy		Category II, Healthy		Category III, Impaired	
Stream Condition Index Metrics	Rep 1	Rep 2	Rep 1	Rep 2	Rep 1	Rep 2	Rep 1	Rep 2	Rep 1	Rep 2	Rep 1	Rep 2	Rep 1	Rep 2
Number of Total Taxa	34	35	42	42	35	33	28	28	30	28	40	31	18	15
Number of Ephemeroptera Taxa	3	2	5	5	4	4	3	1	4	3	3	0	0	0
Number of Trichoptera Taxa	3	4	5	5	7	5	5	3	5	2	4	2	2	3
Number of Clinger Taxa	3	5	7	7	5	4	4	3	7	3	6	5	3	4
Number of Long-lived Taxa	1	1	0	1	1	1	2	1	1	1	2	2	0	1
Number of Sensitive Taxa	1	0	3	3	4	3	4	1	4	2	1	1	1	1
Percent of Dominant Taxon	15.5	9.0	12.8	10.1	16.4	17.6	22.1	22.6	22.3	23.8	17.3	29.4	36.4	33.1
Percent Suspension Feeders and Filterers	20.8	18.1	19.6	13.0	25.8	23.9	16.9	25.8	24.8	27.5	25.0	21.7	8.4	5.8
Percent of Tanytarsini Individuals	24.7	32.6	12.2	15.2	8.8	3.5	0.7	0.0	7.0	3.3	8.0	2.8	0.0	0.0
Percent of Very Tolerant Individuals	34.5	18.1	19.2	13.3	9.4	9.9	13.8	12.3	8.3	8.0	20.7	49.0	62.9	63.6
Total Number of Individuals	142	144	156	158	159	142	145	155	157	151	150	143	143	154
Community Composition: Percent of total														
Dominant Taxon (name)	Pyrgophorus platyrachis	Tanytarsus sp. c epler	Dicrotendipes neomodestus	Polypedilum flavum	Cheumatopsyche	Cheumatopsyche	Microcylloepus pusillus	Cheumatopsyche	Polypedilum flavum	Polypedilum flavum	Cheumatopsyche	Melanoides	Cricotopus bicinctus	Cricotopus bicinctus
Amphipoda	4.9	7.6	6.4	6.3	6.9	12.0	17.2	10.3	1.9	4.6	0.0	0.7	0.7	0.7
Coleoptera	1.4	5.6	7.1	3.2	5.7	7.0	24.8	19.4	8.9	7.3	19.3	11.9	16.1	11.7
Decapoda	0.0	1.4	0.0	0.0	0.0	0.0	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Diptera	48.6	61.1	53.2	51.3	35.2	29.6	20.0	22.6	48.4	51.0	40.7	24.5	44.8	45.5
Ephemeroptera	4.2	3.5	7.7	9.5	17.0	13.4	10.3	7.7	24.8	19.2	2.7	0.0	0.0	0.0
Gastropoda	21.8	7.6	3.9	1.3	5.0	8.5	5.5	6.5	1.9	2.7	9.3	40.6	8.4	14.3
Isopoda	0.0	0.0	0.0	0.0	0.0	0.0	1.4	0.7	0.0	0.0	0.0	0.0	0.0	0.0
Odonata	2.1	1.4	1.9	1.9	0.6	2.1	2.8	1.3	0.0	0.7	0.7	2.1	0.7	0.0
Oligochaeta	0.7	0.0	1.3	3.8	0.0	0.7	0.0	0.0	0.0	0.7	3.3	0.7	19.6	16.9
Pelecypoda	3.5	0.0	0.0	0.6	3.1	1.4	0.7	1.9	1.9	2.7	1.3	8.4	3.5	2.0
Polychaeta	0.0	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Trichoptera	11.3	11.1	16.7	20.3	25.2	24.7	16.6	25.2	11.5	11.3	19.3	11.2	6.3	8.4
Trombidiformes	0.0	0.0	1.3	1.9	0.6	0.0	0.0	1.3	0.6	0.0	0.0	0.0	0.0	0.0
Functional Feeding Groups: Percent of total														
Browser-Grazers	0.0	0.7	0.0	0.0	0.0	0.0	1.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0
Burrowing Deposit Feeders	0.7	0.0	1.3	3.8	0.0	0.7	0.0	0.0	0.0	0.7	3.3	0.7	19.6	16.9
Piercers	0.0	1.7	5.8	8.5	4.1	2.8	0.0	0.0	0.0	0.0	0.7	0.7	1.4	3.3
Predators	10.6	12.5	11.2	13.6	7.2	9.9	7.2	12.3	4.8	3.6	8.3	11.2	1.4	0.0
Scavengers	0.0	0.7	0.0	0.0	0.3	0.4	1.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0
Scrapers	25.0	11.5	12.5	11.7	14.2	14.4	21.7	18.7	17.5	10.6	18.0	47.2	16.4	21.4
Shredders	8.1	10.4	11.9	12.7	14.8	13.7	14.8	10.0	15.0	19.2	11.7	5.2	21.3	22.7
Surface Deposit Feeders	34.9	44.4	37.2	36.7	33.7	33.5	37.2	30.0	37.9	38.4	31.0	13.3	31.5	29.2
Suspension Feeders	20.8	18.1	19.6	13.0	25.8	23.9	16.9	25.8	24.8	27.5	25.0	21.7	8.4	5.8
Unknown	0.0	0.0	0.6	0.0	0.0	0.7	0.0	1.9	0.0	0.0	2.0	0.0	0.0	0.7

APPENDIX B

Qualitative Periphyton Sampling Species Lists

Upper Basin Sites		Wahneta Farms Drainage Canal	Peace Canal @ 91 Mine Rd	Peace River @ 60	Bowlegs Creek	Whidden Creek	Payne Creek @ Hobb Rd	Payne Creek @ St. Park	Payne Creek @ St. Park (DUP)
Order	**Lowest Taxon Name**								
Bacillariophyta (phylum)	*Bacillariophyta*	251	281	188	283	260	257	282	271
Chaetophorales	*Microthamnion kuetzingianum*	-	1	3	-	1	-	-	-
Chlorococcales	*Ankistrodesmus*	-	-	4	-	-	-	-	-
	Chlorella	3	1	26	3	2	3	1	3
	Coelastrum microporum	-	1	-	-	-	1	-	-
	Crucigenia tetrapedia	-	-	1	-	-	-	-	-
	Dictyosphaerium pulchellum	-	-	4	-	-	-	-	-
	Gloeocystis	-	-	2	-	-	-	-	-
	Kirchneriella elongata	-	-	1	-	-	-	-	-
	Pediastrum boryanum	-	-	-	-	-	-	1	-
	Scenedesmus	2	1	1	-	1	-	-	-
	Scenedesmus bijuga	-	2	1	1	1	-	-	2
	Scenedesmus dimorphus	-	-	3	-	-	-	1	-
	Scenedesmus quadricauda	-	1	7	-	3	1	1	-
	Selenastrum	1	-	-	-	4	-	-	-
Chlorophyceae	*Chlorophyceae*	-	-	-	-	-	-	1	2
Microsporales	*Microspora*	-	-	-	1	-	-	-	-
Oedogoniales	*Oedogonium*	-	1	-	-	-	-	1	-
Ulotrichales	*Ulothrix*	-	-	-	-	-	-	1	2
Volvocales	*Chlamydomonas*	-	-	1	-	-	-	-	-
Zygnematales	*Actinotaenium*	1	-	-	-	-	-	-	-
	Closterium	-	-	-	-	-	-	1	-
	Closterium moniliferum moniliferum	2	-	-	1	-	-	-	-
	Cosmarium	-	1	1	3	-	-	-	-
	Mougeotia	4	-	-	-	-	-	-	-
	Staurastrum	-	-	1	-	-	-	-	-
Ochromonadales	*Mallomonas*	-	-	-	-	-	-	1	-
Chroococcales	*Aphanocapsa*	-	-	-	3	-	1	-	-
	Aphanothece	-	1	-	-	-	-	-	-
	Chroococcus minutus	-	1	-	-	-	-	-	-
	Cyanobium parvum	2	1	3	3	5	3	-	3
	Merismopedia tenuissima	-	-	1	-	-	1	-	1
	Merismopedia warmingiana	1	-	-	-	-	-	-	-
	Rhabdogloea	-	-	12	-	-	-	-	-
	Synechocystis	6	2	17	9	15	7	4	11
Nostocales	*Anabaena*	-	-	1	-	-	-	-	-
Oscillatoriales	*Jaaginema*	22	5	9	3	8	16	7	9
	Lyngbya	-	-	-	-	-	1	-	-
	Microcoleus	-	-	1	-	-	-	-	-
	Oscillatoria	1	1	-	-	-	-	2	-
	Planktolyngbya	3	-	2	-	1	8	1	3
	Planktolyngbya contorta	-	-	2	-	-	-	-	-
	Planktothrix	1	3	4	-	2	-	3	2
	Pseudanabaena	1	1	2	-	-	-	-	1
	Romeria	-	-	1	-	-	-	-	-
	Schizothrix calcicola	-	-	2	-	-	7	-	-
Stigonematales	*Hapalosiphon*	-	-	1	-	-	-	-	-
Euglenales	*Euglena*	-	-	1	-	-	-	-	-
	Lepocinclis	-	-	3	-	-	-	-	-

Middle Basin Sites		Peace River @ 664A	Peace River @ 64	Troublesome Creek	Oak Creek	Charlie Creek @ Sweetwater	Charlie Creek @ Sweetwater (DUP)	Charlie Creek @ 17	Horse Creek @ 665
Order	**Lowest Taxon Name**								
Bacillariophyta (phylum)	*Bacillariophyta*	269	268	245	281	285	269	265	221
Chaetophorales	*Microthamnion kuetzingianum*	1	-	2	1	-	-	1	2
Chlorococcales	*Ankistrodesmus falcatus*	-	-	-	-	-	-	-	1
	Chlorella	6	2	5	3	2	4	-	7
	Coelastrum microporum	-	-	2	-	-	-	-	-
	Scenedesmus	-	1	-	-	-	-	-	4
	Scenedesmus abundans	-	1	-	-	-	-	-	-
	Scenedesmus bicaudatus	-	-	-	-	-	-	-	2
	Scenedesmus bijuga	-	2	-	1	3	1	1	1
	Scenedesmus dimorphus	-	-	-	-	1	-	1	-
	Scenedesmus quadricauda	1	9	-	-	1	2	-	20
	Selenastrum	-	-	-	1	-	-	-	-
Oedogoniales	*Oedogonium*	-	-	-	-	1	-	2	-
Ulotrichales	*Ulothrix*	3	2	-	-	-	1	-	-
Zygnematales	*Closterium*	-	-	-	-	-	-	-	1
	Mougeotia	-	-	-	-	-	-	-	8
	Spirogyra	-	-	-	-	-	-	1	-
Chamaesiphonales	*Chamaesiphon*	8	-	-	-	-	-	-	-
Chroococcales	*Chroococcus minutus*	-	-	1	-	-	-	-	-
	Cyanobium parvum	5	2	2	-	1	3	3	-
	Merismopedia warmingiana	-	-	-	-	-	-	-	1
	Synechocystis	3	11	12	6	5	8	13	7
Nostocales	*Anabaena*	1	1	-	-	-	-	-	7
Oscillatoriales	*Geitlerinema*	-	-	-	-	-	1	-	-
	Jaaginema	9	9	25	7	5	16	11	8
	Komvophoron schmidlei	-	-	-	-	-	-	-	2
	Lyngbya	-	-	-	-	-	-	1	-
	Oscillatoria tenuis	-	-	-	-	-	-	-	1
	Phormidium	-	-	-	-	-	-	-	1
	Planktolyngbya	1	1	4	2	-	-	4	7
	Planktothrix	-	1	1	1	-	-	1	-
	Pseudanabaena	-	1	1	-	1	-	1	1
	Schizothrix calcicola	-	-	2	2	1	-	-	-
Euglenales	*Euglena*	-	-	-	-	-	-	-	1
	Lepocinclis	-	-	-	-	-	-	-	2
	Trachelomonas	-	-	-	1	-	-	-	-
Mischococcales	*Pleurogaster oocystoides*	-	-	1	-	-	-	-	-

Lower Basin Sites		Horse Creek @ 70	Horse Creek @ 72	Horse Creek @ 72 (DUP)	Joshua Creek	Hawthorne Creek	Hog Bay @ 763	Prairie Creek
Order	**Lowest Taxon Name**							
Bacillariophyta (phylum)	*Bacillariophyta*	264	276	273	295	248	257	288
Chaetophorales	*Microthamnion kuetzingianum*	-	1	-	-	-	-	4
Chlorococcales	*Ankistrodesmus*	-	-	-	-	-	1	-
	Chlorella	3	1	5	-	7	2	-
	Scenedesmus	-	1	-	-	-	1	-
	Scenedesmus bijuga	1	2	-	1	-	-	3
	Scenedesmus quadricauda	3	-	4	-	-	-	-
	Selenastrum	-	1	-	-	21	-	-
Oedogoniales	*Oedogonium*	1	-	1	-	1	-	-
Ulotrichales	*Ulothrix*	-	2	-	-	-	1	-
Zygnematales	*Closterium*	-	-	-	-	-	-	1
	Closterium moniliferum moniliferum	-	-	-	1	-	-	1
Cryptomonadales	*Cryptomonas*	-	-	-	-	-	1	-
Chamaesiphonales	*Chamaesiphon*	-	-	-	-	4	-	-
	Cyanobium parvum	1	1	-	-	6	4	1
	Merismopedia punctata	-	-	-	-	-	-	1
	Merismopedia warmingiana	-	-	-	-	3	-	-
	Rhabdogloea	-	-	-	-	1	-	-
	Synechocystis	4	3	6	-	2	7	-
Nostocales	*Anabaena*	1	1	-	-	1	-	-
	Microchaete	1	-	-	-	-	-	-
Oscillatoriales	*Jaaginema*	5	12	4	3	8	23	4
	Oscillatoria	-	1	-	-	-	-	-
	Oscillatoria tenuis	1	-	1	-	-	-	-
	Planktolyngbya	-	-	-	-	1	4	1
	Planktothrix	-	2	-	-	-	1	-
	Pseudanabaena	-	-	-	5	2	2	-
	Pseudanabaena mucicola	3	-	1	-	-	-	-
	Schizothrix calcicola	12	-	10	-	-	-	-
Euglenophyceae	*Euglenophyceae*	-	-	-	-	-	1	-

APPENDIX C

Linear Stream Vegetation Survey Results

Dominant plants are noted with a D, followed by (in parentheses) the number of transects in which they are dominant.

MIDDLE SITES	Peace River @ 664A	Peace River @ 64	Troublesome Creek	Oak Creek	Charlie Creek @ Sweetwater	Charlie Creek @ Sweetwater (DUP)	Charlie Creek @ 17	Horse Creek @ 665
Herbaceous Species	*# of transects where species is found*							
Alternanthera philoxeroides			4/ D(4)	8	1		8	9
Azolla caroliniana				3			6	
Bidens laevis								1
Chara spp.				9/ D(9)			4	
Commelina sp.					2			
Cynodon dactylon								2
Cyperaceae sp.	1							
Eichhornia crassipes								6/ D(1)
Eleocharis baldwinii				4				10
Gallium sp.				1				2
Hydrilla verticillata	8/ D(8)							
Hydrocotyle umbellata	7			4				
Hydrocotyle ranunculoides							4/ D(2)	
Hydrocotyle sp.			4				1	3
Hypericum sp.							1	
Juncus repens				2				
Lemna minor	10	5						
Ludwigia repens				8			2	10
Micranthemum umbrosum				6				1
Mikania scandens	10	9		7			3	5
Myriophyllum aquaticum								3
Nuphar advena								3
Nymphaea sp.		1						
Panicum repens							4	
Paspalum distichum		10/ D(5)				2		
Pistia stratioides	7	10						
Poaceae sp.								10/ D(3)
Polygonum hydropiperoides		9/ D(6)		2		4	5	10/ D(4)
Polygonum punctatum	4							
Polygonum sp.					4			
Pontederia cordata				1				
Ptilimnion capillaceaum				6				1
Sacciolepis striata	10							1/ D(1)
Sagittaria latifolia	1							
Salvinia minima				3				10
Scirpus cubensis								1
Spirodela polyrhiza				6			8	
Landoltia (Spirodela) punctata				3			8	
Typha latifolia	2							
Typha sp.								4
Wolffiella spp.								5
Woody Species								
Pinus elliottii		1						
Salix carolina	7						1	1

LOWER SITES	Horse Creek @ 70	Horse Creek @ 72	Horse Creek @ 72 (DUP)	Joshua Creek	Hawthorne Creek	Hog Bay @ 763	Prairie Creek
Herbaceous Species	*# of transects where species is found*						
Alternanthera philoxeroides	8	1	9		9	3	
Azolla caroliniana	9						
Bidens laevis	5						
Ceratophyllum demersum			3				
Chara spp.	8/ D(8)						
Colocasia esculenta					1		
Commelina sp.	1	8	6				
Coreopsis sp.		1					
Cyperus surinamensis	1						
Eichhornia crassipes	10/ D(4)						
Eleocharis baldwinii	1						
Fuirena squarrosa		1					
Gratiola sp.		1					
Hydrilla verticillata				4	6		
Hydrocotyle umbellata	3	6			2	5	
Hydrocotyle sp.			7				
Juncus effusus		4					
Juncus sp.	10						
Lemna minor		8	8		5		
Ludwigia peruviana						6	
Ludwigia repens	10	9	9		1		
Lygodium japonica						1	
Lyngbya	3						
Micranthemum umbrosum	1						
Micranthemum sp.	10	7	3				
Mikania scandens	8	10	9		2		
Myriophyllum aquaticum	5	2	7				
Panicum repens					3		
Panicum sp.						1	
Pistia stratioides					2		
Pluchea odorata		8				5	
Poaceae sp.	4	10/ D(4)	1				
Polygonum hydropiperoides		9	10/ D(7)				
Polygonum punctatum							1
Polygonum sp.	10/ D(2)						
Pontederia cordata		1					
Ptilimnion capillaceaum					1		
Rumex verticillatus					4		
Sacciolepis striata							1
Salvinia minima			3		9	1	
Samolus parviflora		1					
Scirpus sp.		9				7	
Solanum tampicense					1		
Typha latifolia			1				
Typha sp.	3						
Woody Species							
Acer rubrum						3	
Citrus sp.						1	
Psychotria nervosa						2	
Salix carolina	5	10				3	
Schinus terebinthifolius						3	
Taxodium sp.	2						
Ulmus americana						3	

UPPER SITES	Wahneta Farms	Peace Canal @ 91 Mine	Peace River @ 60	Bowlegs Creek	Whidden Creek	Payne Creek @ Hobb Rd	Payne Creek @ St. Park	Payne Creek @ St. Park (DUP)
Herbaceous Species	*# of transects where species is found*							
Alternanthera philoxeroides	10	5	10	9/ D(2)	2		2	
Amaranthus sp.			7					
Apios americana							1	
Azolla caroliniana	3							
Bacopa caroliniana							4	
Bidens alba							1	
Bidens laevis	8							
Boehmaria cylindrica				1				
Brachiaria mutica	10/ D(10)	10/ D(10)	10/ D(10)					5/ D(5)
Cicuta maculata							1	
Colocasia esculenta	2		5				3	
Commelina sp.						1		
Coreopsis sp.							2	
Crinum americanum					2			
Cyperaceae sp.					1			
Cyperus distinctus							1	
Cyperus haspan				2				
Cyperus polystachyos							1	
Cyperus sp.				1				
Dichanthelium dichotomoflorum							1	
Eclipta rostrata (alba)	3							
Eichhornia crassipes	10						1	
Eleocharis baldwinii				1				
Eleocharis sp.				2				
Eryngium sp.			3					
Eupatorium leptophyllum							4	
Gallium sp.				1				
Hydrilla verticillata	6					10/ D(10)	2	5
Hydrocotyle umbellata	4	1	10	6	4/ D(1)	2		2
Hydrocotyle ranunculoides							10	
Juncus effusus	1							
Juncus sp.				1				
Lemna minor		4	10			8		6
Ludwigia leptocarpa	6	1						
Ludwigia peruviana				10/ D(3)	3		2	
Ludwigia repens	3	4	9			5		1
Micranthemum glomeratum	2	4	1	9	1/ D(1)			1
Micranthemum umbrosum				7	1		6	
Mikania scandens			3			7	1	6
Myriophyllum aquaticum		4						
Myriophyllum spicatum			3					
Nasturtium						1		
Nuphar advena				1			5	2
Nymphaea sp.							1	
Osmunda cinnamomea		2	6					
Osmunda regalis			5					
Panicum longifolium							1	
Panicum repens				4/ D(1)	6/ D(1)			
Panicum rigidulum					2			
Peltandra virginica				1				
Phyla nodiflora	2							
Pineapple	1							
Pistia stratioides	10	9	10					
Pluchea camphorata							1	
Pluchea sp.							1	
Poaceae sp.			1		1		1	
Polygonum hydropiperoides	10	2						
Polygonum punctatum						4		6
Polygonum sp.				1			1	
Pontederia cordata	1				1			
Potamogeton illinoensis								1
Ptilimnion capillaceaum				2				
Rumex verticillatus		5		10/ D(4)		5	8	6
Sacciolepis striata			3					
Salvinia minima	10		10					
Samolus parviflora		5					4	
Saururus cernuus				3				
Scirpus cubensis	1							
Thelypteris kunthii							1	
Thelypteris sp.				1				
Tradescantia	10							
Typha domingensis								2
Typha latifolia								
Typha sp.				2			2	
Vicia floridana							1	
Woodwardia virginica				3				

UPPER SITES	Wahneta Farms	Peace Canal @ 91 Mine	Peace River @ 60	Bowlegs Creek	Whidden Creek	Payne Creek @ Hobb Rd	Payne Creek @ St. Park	Payne Creek @ St. Park (DUP)
Woody Species	*# of transects where species is found*							
Acer rubrum		5	4		2			
Magnolia virginiana			1					
Pinus sp.	1							
Quercus sp.	4	2						
Salix carolina					4			4
Sapium sebiferum	1							
Schinus terebinthifolius			6				1	
Taxodium distichum			10	10	1		8	

APPENDIX D

Macroinvertebrate Taxa Lists

Upper Basin Sites		Wahneta Farms Drainage Canal	Peace Canal @ 91 Mine Rd	Peace River @ 60	Bowlegs Creek	Whidden Creek	Payne Creek @ Hobb Rd	Payne Creek @ St. Park	Payne Creek @ St. Park (DUP)
Order	Lowest Taxon Name								
Hirudinea	*Hirudinea*	-	-	-	-	-	1	-	-
Rhynchobdellida	*Helobdella stagnalis*	-	-	-	-	-	-	-	1
Haplotaxida	*Allonais inaequalis*	-	-	-	-	-	1	-	-
	Aulodrilus pigueti	3	-	-	-	-	-	-	-
	Dero digitata complex	-	-	-	-	-	-	1	-
	Dero vaga	-	-	1	-	-	-	-	-
	Limnodrilus hoffmeisteri	-	-	-	-	-	-	-	1
	Naididae	-	-	-	-	-	-	-	2
	Nais communis complex	-	-	1	-	-	-	-	-
	Pristina	1	-	-	-	-	-	-	1
	Tubificidae	8	1	-	-	-	-	-	1
Lumbriculida	*Eclipidrilus*	-	-	-	1	-	-	-	-
	Lumbriculus variegatus	-	-	4	-	-	-	-	-
Acariformes	*Arrenurus*	-	1	-	-	-	-	-	-
	Atractides	-	-	-	1	-	-	-	-
	Hygrobates	-	-	-	1	-	-	-	-
	Mideopsis	-	-	-	1	-	-	-	-
	Neumania	-	-	-	-	-	-	1	-
Amphipoda	*Amphipoda*	2	-	-	-	-	-	-	-
	Hyalella azteca	89	27	28	2	2	20	34	15
Decapoda	*Cambaridae*	1	-	-	-	-	-	-	-
	Palaemonetes	-	-	9	-	-	1	1	-
Coleoptera	*Dryopidae*	-	-	3	-	-	-	-	-
	Dubiraphia vittata	-	-	-	8	2	9	10	15
	Haliplidae	-	-	-	1	-	-	-	-
	Hydrovatus	-	-	-	-	-	-	1	-
	Microcylloepus pusillus	-	-	-	-	10	15	12	3
	Ora/scirtes	-	-	-	-	-	1	-	-
	Peltodytes	-	1	-	-	-	-	-	1
	Scirtidae	-	-	1	-	-	-	-	-
	Staphylinidae	-	-	2	-	-	-	-	-
	Stenelmis	-	-	-	10	87	13	26	10
Diptera	*Ablabesmyia*	-	-	-	-	-	-	-	1
	Ablabesmyia mallochi	-	5	-	1	-	-	1	2
	Ablabesmyia rhamphe grp.	-	3	-	-	-	-	2	-
	Atrichopogon	-	-	-	-	-	-	2	1
	Beardius	-	-	-	-	-	-	1	-
	Ceratopogonidae	6	1	1	-	-	-	-	5
	Chironomidae	7	11	10	12	4	11	1	12
	Chironomus	4	-	-	-	-	-	-	-
	Cladopelma	2	-	-	-	-	-	-	-
	Cladotanytarsus	-	-	-	11	-	-	2	-
	Clinotanypus	1	-	-	2	-	-	1	-
	Corynoneura	9	-	-	2	-	-	3	1
	Corynoneura sp. g epler	-	-	-	-	1	-	-	-
	Cricotopus	-	-	-	-	1	-	-	-
	Cricotopus bicinctus	-	-	-	11	-	4	3	-
	Cricotopus or orthocladius	1	-	-	-	2	-	-	5
	Cryptochironomus	-	-	-	-	-	-	1	-
	Cryptotendipes	-	8	-	-	-	-	-	-
	Culex	-	-	1	-	-	-	-	-
	Dicrotendipes	-	-	-	-	-	-	7	-
	Dicrotendipes neomodestus	-	-	-	-	-	5	4	14
	Dolichopodidae	-	-	1	-	-	-	-	-
	Endotribelos hesperium	-	2	9	-	-	-	-	-
	Goeldichironomus	-	1	-	-	-	-	-	-
	Goeldichironomus cf. natans	-	-	13	-	-	-	-	-
	Kiefferulus	-	-	2	-	-	-	-	-
	Labrundinia	-	1	1	-	-	-	-	3
	Labrundinia pilosella	-	-	-	1	-	-	3	-
	Larsia	-	-	1	-	-	-	-	-
	Limonia	-	-	-	-	-	-	-	1

Upper Basin Sites (continued)		Wahneta Farms Drainage Canal	Peace Canal @ 91 Mine Rd	Peace River @ 60	Bowlegs Creek	Whidden Creek	Payne Creek @ Hobb Rd	Payne Creek @ St. Park	Payne Creek @ St. Park (DUP)
Order	Lowest Taxon Name								
Diptera	*Megistocera*	-	-	1	-	-	-	-	-
	Monopelopia	1	-	4	-	-	-	-	-
	Nanocladius	2	-	-	-	-	-	2	-
	Nilothauma	-	-	-	2	-	-	-	-
	Palpomyia/bezzia grp.	-	-	5	2	-	-	6	-
	Parachironomus	-	1	1	-	-	-	-	-
	Parakiefferiella	-	-	-	-	-	-	1	-
	Paratanytarsus	12	-	-	-	-	-	-	-
	Pentaneura inconspicua	-	2	-	3	7	-	8	5
	Polypedilum	-	-	-	1	1	1	-	2
	Polypedilum beckae	-	6	4	-	-	-	-	-
	Polypedilum fallax	-	-	-	-	-	3	-	-
	Polypedilum flavum	-	-	-	15	62	35	26	45
	Polypedilum halterale grp.	1	6	2	1	-	-	2	-
	Polypedilum illinoense grp.	30	7	34	5	-	14	19	6
	Polypedilum scalaenum grp.	-	15	-	4	4	8	4	9
	Polypedilum sp. a epler	-	-	-	-	-	-	1	-
	Polypedilum tritum	-	-	1	1	-	-	-	-
	Pseudochironomus	-	1	-	-	-	-	3	-
	Pseudosmittia	-	-	-	1	-	-	-	-
	Psychodidae	-	-	1	-	-	-	-	-
	Rheotanytarsus exiguus grp.	6	-	-	4	-	1	-	-
	Rheotanytarsus pellucidus	1	-	-	2	-	-	1	-
	Simulium	-	-	-	-	35	2	-	-
	Stelechomyia perpulchra	-	-	-	1	5	-	2	-
	Stempellina sp. a epler	-	-	-	7	-	-	-	2
	Stempellinella fimbriata	-	-	-	4	-	-	-	-
	Stenochironomus	-	-	-	2	1	-	1	-
	Stratiomyidae	-	-	1	-	-	-	-	-
	Tanypus	1	-	-	-	-	-	-	-
	Tanytarsus	-	5	-	1	-	1	6	2
	Tanytarsus sp. a epler	-	10	1	5	1	5	11	17
	Tanytarsus sp. c epler	-	6	-	91	1	7	16	7
	Tanytarsus sp. f epler	13	-	6	-	-	-	-	1
	Tanytarsus sp. g epler	3	-	-	-	-	-	-	-
	Tanytarsus sp. l epler	2	-	-	6	-	-	5	1
	Tanytarsus sp. m epler	-	-	-	11	-	-	-	-
	Tanytarsus sp. o epler	-	-	-	13	-	-	-	-
	Tanytarsus sp. s epler	-	-	-	5	-	-	-	-
	Tanytarsus sp. t epler	-	26	9	23	-	-	8	12
	Tanytarsus sp. v epler	-	-	-	-	-	-	-	6
	Tanytarsus sp. y epler	-	-	-	2	-	-	-	-
	Thienemanniella	-	-	-	1	1	2	6	1
	Thienemanniella lobapodema	-	-	-	5	-	-	-	-
	Tipula	-	-	-	1	-	-	-	-
	Tribelos fuscicornis	-	1	-	4	-	1	8	-
Ephemeroptera	*Acentrella*	-	-	-	-	-	2	-	-
	Acerpenna pygmaea	-	-	-	1	-	-	-	-
	Baetidae	4	-	-	-	-	-	2	-
	Baetis intercalaris	-	-	-	-	6	2	-	1
	Brachycercus	-	-	-	-	-	1	1	-
	Caenis	72	55	43	-	2	9	-	-
	Callibaetis	-	-	7	2	-	-	1	-
	Callibaetis floridanus	-	8	-	-	-	-	-	-
	Centroptilum triangulifer	-	-	-	-	-	-	3	-
	Cercobrachys etowah	-	-	-	-	-	-	-	1
	Ephemeroptera	-	-	-	-	-	-	-	1
	Maccaffertium	-	-	-	1	-	-	2	-
	Procloeon	-	-	-	-	-	-	-	2
	Pseudocloeon	-	-	-	-	-	12	3	-
	Pseudocloeon ephippiatum	-	-	-	-	-	-	-	1
	Pseudocloeon propinquum	-	-	-	-	-	-	-	9
	Stenacron	-	-	-	-	-	-	1	-
	Tricorythodes albilineatus	-	-	-	-	6	9	8	6
Heteroptera	*Lethocerus*	-	-	-	-	-	-	1	-
	Lethocerus uhleri	-	-	-	1	-	-	-	-
	Paraplea	-	-	-	-	-	-	-	1
	Pelocoris	-	-	2	-	-	-	-	-
Lepidoptera	*Lepidoptera*	-	-	1	-	-	-	-	-
Odonata	*Argia*	-	-	-	-	1	15	4	8
	Calopteryx	-	-	-	-	-	6	-	-
	Coenagrionidae	8	-	11	2	-	-	1	1
	Enallagma	-	5	3	-	-	19	-	-
	Enallagma coecum	-	-	-	-	-	-	2	-

Upper Basin Sites (continued)		Wahneta Farms Drainage Canal	Peace Canal @ 91 Mine Rd	Peace River @ 60	Bowlegs Creek	Whidden Creek	Payne Creek @ Hobb Rd	Payne Creek @ St. Park	Payne Creek @ St. Park (DUP)
Order	Lowest Taxon Name								
Odonata	*Ischnura*	-	-	2	-	-	-	-	-
	Libellulidae	2	-	-	-	-	-	-	-
	Nehalennia	-	-	1	-	-	-	-	-
Trichoptera	*Cernotina*	-	-	-	-	1	-	1	-
	Cheumatopsyche	1	-	-	3	6	7	1	4
	Hydropsyche	-	-	-	-	5	-	1	1
	Hydropsychidae	-	-	-	-	5	-	-	1
	Hydroptila	-	1	-	-	14	3	5	1
	Nectopsyche	-	-	-	-	-	-	7	-
	Nectopsyche exquisita	-	-	-	-	-	1	-	2
	Neotrichia	-	1	-	4	1	1	-	-
	Oecetis	-	1	-	1	1	1	-	-
	Oecetis georgia	-	-	-	-	-	-	-	1
	Oxyethira	3	1	-	3	-	2	1	-
	Triaenodes	-	-	-	-	-	1	-	-
	Trichoptera	-	-	-	-	-	-	-	1
Bivalvia	*Bivalvia*	-	1	-	-	-	-	-	-
Veneroida	*Corbicula fluminea*	-	-	-	-	2	4	2	15
	Eupera cubensis	-	-	7	-	-	-	-	-
	Sphaeriidae(mollusca)	-	-	-	-	-	-	-	2
Basommatophora	*Ancylidae*	3	19	10	4	2	13	-	-
	Ferrissia	-	-	-	-	-	-	-	1
	Gyraulus parvus	-	-	-	-	-	5	-	-
	Lymnaeidae	-	-	-	-	-	-	-	1
	Micromenetus	1	23	9	-	-	-	-	-
	Physa	-	-	-	-	-	3	-	-
	Physidae	-	-	3	-	-	-	-	4
	Planorbella	-	-	1	-	-	-	1	-
	Pseudosuccinea columella	-	-	-	1	-	-	-	-
Gastropoda	*Gastropoda*	-	-	1	-	-	-	-	-
Mesogastropoda	*Amnicola*	-	-	6	-	-	-	-	-
	Elimia	-	-	-	-	-	2	-	-
	Hydrobiidae	-	16	6	-	22	-	-	-
	Melanoides	-	-	-	-	-	-	4	8
	Pyrgophorus platyrachis	-	26	24	-	-	8	3	10
	Spilochlamys	-	-	-	-	-	-	1	-
Hoplonemertea	*Prostoma*	-	-	-	1	-	-	-	-

Middle Basin Sites		Peace River @ 664A	Peace River @ 64	Troublesome Creek	Oak Creek	Charlie Creek @ Sweetwater	Charlie Creek @ Sweetwater (DUP)	Charlie Creek @ 17	Horse Creek @ 665
Order	**Lowest Taxon Name**								
Rhynchobdellida	*Desserobdella phalera*	-	1	-	-	-	-	-	-
	Helobdella triserialis	-	-	1	-	-	-	-	-
Haplotaxida	*Allonais inaequalis*	-	-	-	-	-	-	1	-
	Aulodrilus pigueti	-	-	-	-	-	-	-	1
	Bratislavia unidentata	-	-	-	-	-	-	-	3
	Enchytraeidae	-	-	1	-	-	-	-	-
	Limnodrilus hoffmeisteri	-	-	-	-	-	1	-	-
	Naididae	-	1	-	1	-	-	-	-
	Nais communis complex	-	-	-	-	-	-	-	6
	Pristina	-	-	-	-	-	-	-	1
	Tubificidae	1	4	2	1	-	3	1	-
Lumbriculida	*Eclipidrilus*	-	-	-	1	-	-	-	-
	Eclipidrilus palustris	-	-	-	-	-	1	-	-
	Lumbriculus variegatus	-	-	-	-	1	-	-	-
Polychaeta	*Spionidae*	1	-	-	-	-	-	-	-
Acariformes	*Acariformes*	-	-	-	1	-	-	-	-
	Atractides	-	-	-	-	1	-	1	-
	Hygrobates	-	-	-	2	-	-	-	-
	Neumania	-	-	-	-	-	-	-	2
	Unionicola	-	-	-	-	-	-	-	2
Amphipoda	*Hyalella azteca*	17	8	1	15	14	28	14	45
Decapoda	*Cambaridae*	-	-	-	-	-	1	-	-
	Palaemonetes	1	-	-	4	-	-	-	8
Coleoptera	*Dineutus*	-	-	-	2	-	-	-	-
	Dryopidae	-	-	1	-	-	-	-	1
	Dubiraphia vittata	2	7	23	7	-	-	1	-
	Dytiscidae	-	-	-	2	-	-	-	-
	Haliplidae	-	-	-	4	-	-	-	-
	Hydraena	-	-	-	-	1	-	-	-
	Hydrovatus	-	-	-	1	-	-	-	-
	Microcylloepus pusillus	1	-	77	-	-	-	2	-
	Ora/scirtes	-	-	-	-	-	-	-	2
	Peltodytes	-	-	-	-	-	-	1	2
	Prionocyphon	-	-	-	3	-	-	-	-
	Scirtidae	-	-	-	-	-	-	-	2
	Stenelmis	7	10	16	36	31	11	35	-
	Tropisternus lateralis	-	-	-	-	-	1	-	-
Collembola	*Collembola*	-	-	1	-	-	-	-	-
Diptera	*Ablabesmyia mallochi*	-	2	4	4	-	-	4	1
	Ablabesmyia rhamphe grp.	-	1	-	-	-	-	-	-
	Apedilum	-	4	-	-	-	-	1	-
	Atrichopogon	-	3	-	13	-	-	1	-
	Cecidomyiidae	-	1	-	-	-	-	-	-
	Ceratopogonidae	1	1	-	-	-	1	1	1
	Chironomidae	13	-	6	15	3	2	24	6
	Cladopelma	-	-	-	-	-	-	-	1
	Cladotanytarsus	-	1	-	1	-	-	-	6
	Cladotanytarsus cf. daviesi	-	2	-	-	-	-	-	9
	Cricotopus bicinctus	2	10	-	-	-	6	3	-
	Cricotopus or orthocladius	-	8	-	5	-	-	-	1
	Cryptochironomus	-	2	-	2	-	-	3	1
	Cryptotendipes	-	-	1	1	-	-	1	-
	Dasyhelea	-	-	-	1	-	-	-	-
	Dicrotendipes	-	-	-	-	-	-	-	1
	Dicrotendipes neomodestus	39	22	-	4	-	1	21	11
	Djalmabatista pulcher	-	18	-	-	-	-	-	-
	Drosophila	-	2	-	-	-	-	-	-
	Endochironomus	-	-	-	-	-	-	-	1
	Endotribelos hesperium	-	9	-	-	-	-	1	-
	Labrundinia	-	-	-	-	-	-	-	3
	Labrundinia pilosella	-	-	-	-	-	-	-	2
	Limonia	-	1	-	-	-	-	-	-
	Megistocera	-	-	-	-	1	-	-	-
	Monopelopia	-	1	-	-	-	-	-	-
	Nanocladius	-	-	-	2	-	-	-	-
	Odontomyia	-	-	-	-	-	-	5	-
	Palpomyia/bezzia grp.	-	7	-	-	-	-	-	-
	Parachironomus	-	1	-	-	-	-	1	-
	Paralauterborniella nigrohalterale	-	-	-	-	-	-	-	1
	Parametriocnemus	-	-	3	-	-	-	-	-
	Pentaneura inconspicua	5	1	1	2	2	3	-	-
	Polypedilum	-	1	-	-	-	-	-	1

Middle Basin Sites (continued)		Peace River @ 664A	Peace River @ 64	Troublesome Creek	Oak Creek	Charlie Creek @ Sweetwater	Charlie Creek @ Sweetwater (DUP)	Charlie Creek @ 17	Horse Creek @ 665
Order	**Lowest Taxon Name**								
Diptera	*Polypedilum aviceps*	-	-	1	-	-	-	-	-
	Polypedilum beckae	-	1	-	-	-	-	-	-
	Polypedilum fallax	-	2	7	15	-	-	-	-
	Polypedilum flavum	9	-	24	26	19	30	12	1
	Polypedilum illinoense grp.	1	57	1	12	1	1	5	2
	Polypedilum scalaenum grp.	1	3	4	3	-	1	5	10
	Polypedilum trigonus	-	-	-	-	-	-	-	1
	Polypedilum tritum	-	1	-	-	-	-	-	1
	Procladius	-	-	-	-	-	-	2	2
	Pseudochironomus	9	30	-	-	-	-	19	1
	Rheocricotopus robacki	-	-	7	-	-	-	-	-
	Rheotanytarsus exiguus grp.	1	-	6	10	-	-	-	1
	Rheotanytarsus pellucidus	-	-	-	1	-	-	-	1
	Simulium	-	-	1	1	-	7	-	-
	Simulium taxodium	-	-	-	-	3	-	-	-
	Stelechomyia perpulchra	-	-	1	-	-	1	1	-
	Stenochironomus	-	-	5	6	1	1	3	-
	Tanytarsus	-	-	-	-	-	-	-	7
	Tanytarsus sp. a epler	-	1	-	17	2	2	8	7
	Tanytarsus sp. c epler	-	1	-	6	2	-	18	3
	Tanytarsus sp. g epler	-	-	-	-	-	-	-	2
	Tanytarsus sp. k epler	-	11	-	-	-	-	4	-
	Tanytarsus sp. l epler	-	-	1	-	-	-	-	8
	Tanytarsus sp. p epler	-	-	-	-	-	-	-	1
	Tanytarsus sp. t epler	-	1	-	-	-	-	-	9
	Tipulidae	1	-	1	-	-	-	-	-
	Tribelos	-	-	1	-	-	-	-	-
	Tribelos fuscicornis	-	5	1	2	-	-	-	-
	Xenochironomus xenolabis	-	-	-	2	-	-	-	-
Ephemeroptera	*Acentrella*	5	-	-	-	-	-	-	-
	Acerpenna pygmaea	-	-	1	-	-	1	-	-
	Baetidae	26	3	1	2	-	-	-	4
	Baetis intercalaris	20	-	2	-	46	33	-	-
	Brachycercus	-	-	-	-	-	-	3	-
	Caenis	-	8	-	2	6	1	3	75
	Callibaetis	-	-	-	5	-	-	5	2
	Centroptilum triangulifer	-	1	-	-	-	-	-	-
	Maccaffertium	-	-	-	7	45	21	7	-
	Plauditus	-	-	-	-	2	-	-	-
	Procloeon	-	2	-	-	-	-	1	6
	Pseudocloeon	2	-	4	12	5	10	-	-
	Stenacron	-	-	-	-	-	-	1	-
	Tricorythodes albilineatus	38	18	-	-	-	2	7	-
Heteroptera	*Belostoma*	-	-	-	-	-	-	-	1
	Gerridae	-	-	-	-	-	-	1	-
	Paraplea	-	-	-	-	3	8	1	1
	Pleidae	-	2	-	-	-	-	-	-
Lepidoptera	*Lepidoptera*	-	-	2	-	1	1	1	-
	Pyralidae	-	2	-	1	-	-	-	1
Megaloptera	*Corydalus cornutus*	-	-	-	-	-	-	1	-
Odonata	*Argia*	4	-	2	3	5	3	1	-
	Coenagrionidae	2	2	1	-	-	1	-	7
	Enallagma	8	-	-	7	2	1	-	-
	Erythemis	-	-	-	-	-	-	1	-
	Gomphidae	1	-	1	-	-	-	-	-
	Tetragoneuria cynosura	-	-	-	-	-	-	-	1
Trichoptera	*Cernotina*	-	-	-	8	-	-	-	-
	Cheumatopsyche	16	-	25	2	42	28	1	-
	Cyrnellus fraternus	-	-	-	-	-	-	1	1
	Hydropsyche	1	-	-	-	60	77	2	-
	Hydropsychidae	1	-	-	-	-	-	-	-
	Hydroptila	30	-	6	-	-	-	2	-
	Nectopsyche	-	-	3	-	1	-	1	-
	Nectopsyche exquisita	-	-	-	-	-	1	-	-
	Neotrichia	1	-	2	-	-	-	1	-
	Oecetis	1	-	-	-	-	-	1	-
	Oecetis nocturna	-	3	-	-	-	-	-	-
	Oxyethira	3	1	1	-	-	-	4	-
	Polycentropodidae	-	-	2	-	-	-	-	-
	Triaenodes	-	-	2	-	1	1	-	-
Bivalvia	*Bivalvia*	-	6	-	-	-	-	-	1
Veneroida	*Corbicula fluminea*	1	3	6	4	1	10	13	2
	Sphaeriidae(mollusca)	-	-	5	2	-	-	-	-
Basommatophora	*Ancylidae*	7	6	1	9	1	-	8	1
	Lymnaeidae	-	-	-	1	-	-	-	-
	Micromenetus	1	-	-	-	-	-	1	-
	Physa	-	-	1	-	-	-	4	2
	Physidae	5	1	-	-	-	-	-	-
	Planorbella	12	-	2	1	-	-	-	-
	Planorbella scalaris	14	-	-	-	-	-	-	-
	Planorbidae	-	1	2	-	-	-	2	-
Mesogastropoda	*Elimia*	-	-	-	-	-	-	-	1
	Hydrobiidae	2	1	18	-	2	4	9	-
	Melanoides	5	-	-	11	2	5	2	-
	Pyrgophorus platyrachis	-	-	-	-	-	-	4	-
	Viviparus georgianus	-	-	1	-	-	-	-	-
Platyhelminthes	*Platyhelminthes*	-	-	-	1	-	-	1	-

Lower Basin Sites		Horse Creek @ 70	Horse Creek @ 72	Horse Creek @ 72 (DUP)	Joshua Creek	Hawthorne Creek	Hog Bay @ 763	Prairie Creek
Order	Lowest Taxon Name							
Rhynchobdellida	*Desserobdella phalera*	-	-	-	1	-	-	-
Haplotaxida	*Aulodrilus pigueti*	-	-	-	-	1	-	-
	Naididae	1	-	-	-	-	-	6
	Nais communis complex	-	1	-	-	-	-	45
	Slavina appendiculata	-	5	-	-	-	-	-
	Tubificidae	-	2	1	-	-	6	3
Polychaeta	*Polychaeta*	-	1	-	-	-	-	-
Acariformes	*Atractides*	-	2	-	2	1	-	-
	Hygrobates	-	3	-	-	-	-	-
	Limnesia	-	-	1	-	-	-	-
Amphipoda	*Hyalella azteca*	18	20	28	41	10	1	2
Decapoda	*Palaemonetes*	2	-	-	1	-	-	-
Isopoda	*Caecidotea*	-	-	-	3	-	-	-
Coleoptera	*Chrysomelidae*	3	-	-	-	-	-	-
	Dineutus	-	-	2	-	-	-	-
	Dubiraphia vittata	1	1	5	1	10	37	3
	Hydraena	-	1	-	-	-	-	-
	Microcylloepus pusillus	-	1	2	59	3	2	-
	Ora/scirtes	-	1	-	-	2	-	-
	Peltodytes	3	1	1	-	-	2	-
	Prionocyphon	-	-	-	-	-	1	-
	Stenelmis	3	11	9	6	10	4	38
Diptera	*Ablabesmyia mallochi*	7	3	1	5	1	3	1
	Atrichopogon	-	-	-	-	2	-	-
	Cecidomyiidae	-	-	-	-	-	1	-
	Ceratopogonidae	1	-	-	-	-	-	-
	Chironomidae	10	13	2	14	14	9	17
	Cladotanytarsus	3	3	2	-	4	-	-
	Cladotanytarsus cf. daviesi	13	9	4	-	-	2	-
	Corynoneura	-	-	-	-	1	2	-
	Cricotopus	-	-	-	15	9	-	-
	Cricotopus bicinctus	10	11	-	-	-	15	90
	Cricotopus or orthocladius	1	-	1	-	-	-	21
	Cryptochironomus	3	1	1	2	1	-	-
	Cryptotendipes	1	-	-	-	-	-	-
	Dicrotendipes	2	-	2	-	4	-	-
	Dicrotendipes modestus	1	-	-	1	-	-	-
	Dicrotendipes neomodestus	13	27	7	6	3	2	-
	Diptera	-	-	-	-	-	1	-
	Endotribelos hesperium	2	-	-	-	-	-	-
	Ephydridae	-	-	-	2	-	-	-
	Forcipomyia	-	2	-	-	-	-	-
	Goeldichironomus	-	-	1	-	-	-	-
	Labrundinia becki	-	-	-	-	-	1	-
	Labrundinia pilosella	-	7	-	2	-	-	-
	Larsia	1	-	-	-	-	-	-
	Megistocera	-	1	-	-	-	1	-
	Palpomyia/bezzia grp.	-	1	-	-	-	-	-
	Parachironomus supparilis	-	-	-	-	-	-	1
	Paracladopelma	-	-	2	-	-	-	-
	Paracladopelma undine	-	-	-	-	-	1	-
	Paratanytarsus	-	-	-	-	-	6	-
	Pentaneura inconspicua	7	11	14	8	7	17	-
	Polypedilum	-	-	-	-	3	1	-
	Polypedilum beckae	-	1	-	-	-	2	-
	Polypedilum fallax	-	-	-	1	-	-	-
	Polypedilum flavum	1	21	37	-	55	3	-
	Polypedilum halterale grp.	-	-	-	-	-	2	-
	Polypedilum illinoense grp.	6	1	2	3	6	4	1
	Polypedilum scalaenum grp.	6	13	2	3	2	7	-
	Pseudochironomus	9	-	-	-	-	-	-
	Rheotanytarsus exiguus grp.	5	1	-	-	1	3	-
	Rheotanytarsus pellucidus	-	4	-	1	7	2	-
	Simulium	-	5	5	-	-	3	-

Lower Basin Sites (continued)		Horse Creek @ 70	Horse Creek @ 72	Horse Creek @ 72 (DUP)	Joshua Creek	Hawthorne Creek	Hog Bay @ 763	Prairie Creek
Order	**Lowest Taxon Name**							
Diptera	*Simulium taxodium*	-	-	-	-	27	-	-
	Stelechomyia perpulchra	-	1	-	1	-	-	-
	Stenochironomus	-	1	2	-	-	3	-
	Tanytarsus	1	1	3	-	-	-	-
	Tanytarsus sp. a epler	12	9	5	-	1	1	-
	Tanytarsus sp. c epler	18	9	1	-	2	-	-
	Tanytarsus sp. f epler	1	-	-	-	1	-	-
	Tanytarsus sp. g epler	-	1	-	-	-	-	-
	Tanytarsus sp. l epler	17	4	2	-	-	1	-
	Tanytarsus sp. t epler	4	-	2	-	-	-	-
	Thienemanniella	-	-	-	-	2	1	2
	Thienemanniella lobapodema	-	1	-	-	-	-	1
	Thienemanniella xena	2	1	-	-	-	-	-
	Tipulidae	-	-	-	-	-	1	-
	Tribelos fuscicornis	-	1	-	-	-	1	-
Ephemeroptera	*Baetidae*	3	-	2	-	-	-	-
	Baetis intercalaris	-	-	-	-	32	1	-
	Caenis	7	5	19	24	-	2	-
	Callibaetis	-	-	-	2	-	-	-
	Callibaetis floridanus	-	3	-	-	-	-	-
	Heptageniidae	-	1	4	1	-	-	-
	Maccaffertium	-	3	-	-	-	-	-
	Maccaffertium smithae	-	1	-	-	-	-	-
	Procloeon	-	-	-	-	-	1	-
	Pseudocloeon	-	-	1	-	24	-	-
	Pseudocloeon propinquum	-	5	-	-	-	-	-
	Stenacron	-	-	-	-	2	-	-
	Tricorythodes albilineatus	1	9	20	-	10	-	-
Heteroptera	*Belostoma lutarium*	-	-	-	-	-	1	-
	Paraplea	-	-	-	1	-	-	-
	Pleidae	2	-	-	-	-	-	-
Lepidoptera	*Lepidoptera*	-	-	-	-	-	1	-
	Parapoynx	1	-	1	-	-	-	-
	Pyralidae	-	-	-	-	-	1	-
Megaloptera	*Corydalus cornutus*	-	-	-	-	-	1	-
Odonata	*Argia*	3	6	2	4	-	-	1
	Argia sedula	-	-	-	-	-	1	-
	Calopterygidae	-	-	-	-	1	-	-
	Coenagrionidae	2	-	2	-	-	-	-
	Enallagma	-	-	-	2	-	2	-
	Tetragoneuria	-	-	-	-	-	1	-
Trichoptera	*Cernotina*	-	1	-	-	-	-	-
	Cheumatopsyche	7	8	50	53	26	39	-
	Hydropsyche	-	-	-	2	5	-	12
	Hydropsychidae	-	3	-	-	-	-	1
	Hydroptila	1	22	10	-	-	1	7
	Nectopsyche	-	-	1	-	2	-	-
	Nectopsyche candida	-	1	-	-	-	-	-
	Nectopsyche exquisita	-	-	1	-	-	1	-
	Nectopsyche pavida	-	-	1	-	-	-	-
	Neotrichia	3	14	2	4	1	3	2
	Oecetis	-	-	4	-	-	-	-
	Oxyethira	21	9	4	3	1	-	-
	Triaenodes	-	-	1	1	-	-	-
	Trichoptera	-	-	1	-	-	1	-
Bivalvia	*Bivalvia*	-	-	-	-	-	-	7
Veneroida	*Corbicula fluminea*	5	1	7	4	7	5	1
	Sphaeriidae(mollusca)	-	-	-	-	-	9	-
Basommatophora	*Ancylidae*	8	1	6	6	-	-	1
	Lymnaeidae	1	-	-	-	-	-	-
	Micromenetus	-	-	-	2	-	-	-
	Planorbidae	-	-	2	1	-	-	-
Gastropoda	*Gastropoda*	2	-	-	3	-	-	1
Mesogastropoda	*Elimia*	-	4	-	-	2	-	-
	Hydrobiidae	-	2	-	6	5	13	-
	Melanoides	6	-	12	-	-	52	25
	Pyrgophorus platyrachis	25	1	-	-	-	7	7
Platyhelminthes	*Platyhelminthes*	-	-	1	3	-	1	1