Appendix A.
Task Level Quality Assurance

1. General Methodology

Data for each nutrient impaired segment in the Flathead Basin were extracted from the master database (refer to Section 2.0 of the main report for a discussion of the construction of this database) and run through a pre-data analysis quality assurance (QA) review. This review ensured that the data were free of errors, quality issues, duplicate samples, or any other anomalies that might affect data analysis.

The parameter codes referred to throughout this appendix are codes that were assigned to facilitate the aggregation of similar data. For example, the code 665 is assigned to total phosphorus data; the original data may have been identified by any of the following names "total phosphorus", "Phosphorus, total, mg/L as P", "TP" and such. In most cases, the codes were included with the data that were transmitted to the U.S. Environmental Protection Agency (EPA). However, when parameter codes were not included, codes were assigned based upon the parameter descriptions provided with the data. Specific issues regarding parameter codes that arose during the compilation of data are discussed in this appendix.

Data stations considered for the each analysis were determined based on location information available from several geographic information system shapefiles including sample sites, National Hydrography Dataset streams and lakes, watershed boundaries, and 2006 303(d) impaired waterbody segments. Sample sites along the impaired mainstem segments of each waterbody were selected, the available information on site locations were checked for accuracy, and the data for the final list of sites was queried from the Flathead Basin master database.

2. Ashley Creek

Following Montana Department of Environmental Quality (DEQ) protocols (2007), it was determined that parameter code 665 would be used to represent total phosphorus (TP), and that all samples using 660 as a parameter code were to be removed from analyses. These samples were reported as PO4, and therefore not representative of total phosphorus concentrations. In total, ten samples with parameter 660 were removed from the Ashley Creek dataset. At these sites, parameter code 671 was also collected and those parameter codes were used to represent SRP in the final dataset.

At several sites, data for both parameter codes 671 and 70507 were collected at the same time. At these sites, values for 671 were retained and values for 70507 were removed. This was done because there are twice as many samples for parameter 671 in the dataset compared to 70507. In total, seven 70507 samples were removed.

A thorough review of all "QA Comment" fields was then performed to ensure no questionable data were included in the final Ashley Creek dataset. After review, it was determined that only one sample with parameter code 665 should be removed because the lab reported "samples not frozen, holding time exceeded."

Several of the concentration values in the database were reported simply as "0". Because it was not clear if these values were at detection limit or some other value, they were removed from the dataset to avoid skewed statistics and charts. In total, 25 samples with values reported as "0" were removed from the dataset.

A thorough search for field and sample duplicates (two separate samples collected at the same location on the same date for the same parameter) as well as database duplicates (one sample reported more than once in the database) was performed. No field and sample duplicates were found. However, a total of 58

database duplicates were found. In all cases, the duplicate samples were reported by two separate entities. The original dataset was retained because the duplicate entries had rounded the sample values up to two decimal places. All 58 duplicate entries were removed from the final Ashley Creek dataset.

A total of 101 samples were removed from the final Ashley Creek phosphorus dataset after the QA/QC checks were completed. Note that there two parameter codes (671 and 70507) were retained for orthophosphate. It is assumed that these parameter codes both report SRP concentrations, following DEQ guidance (DEQ 2007). Throughout the rest of the report, both parameter codes have been combined and are reported as soluble reactive phosphorus (SRP).

Finally, the SRP concentration reported at AC-8 on 6/17/2003 was reported as 0.18 mg/L. SRP concentrations at adjacent stations were assessed to determine if this value was incorrectly entered as 0.18 mg/L instead of 0.018 mg/L because it seemed abnormally high. All of the adjacent stations had concentrations in the 0.020 mg/L range, and the original value presented was higher than the TP concentration. After this investigation, the value was assumed to be a typo and was changed to 0.018 mg/L.

3. Spring Creek

Following DEQ protocols (DEQ 2007), it was determined that parameter code 665 would be used to represent TP and 671 would be use to represent SRP. Because data for this segment are so limited, no other parameter codes were noted in the dataset for TP or SRP.

A total of eight samples were noted as “non-detect” in Spring Creek. These eight values were reduced by half and retained for analyses. No duplicates were found in the dataset.

Two stations (C11SPRGC30 and C11SPRGC31) had result comments indicating sampling errors. All samples from these two stations were removed from the dataset and not included in analyses.

4. Fish Creek

Following DEQ protocols (DEQ 2007), it was determined that parameter code 665 would be used to represent TP and 671 would be use to represent SRP. Because data for this segment are so limited, no other parameter codes were noted in the dataset for TP or SRP.

A total of twelve samples were noted as “non-detect” in Fish Creek. These eight values were reduced by half and retained for analyses. No duplicates were found in the dataset.

The TP concentration at FC01 sampled on 9/13/2005 was originally reported as 0.01 mg/L. The SRP concentration reported at this site and date was originally reported as 0.02 mg/L, twice the concentration value of TP. After further investigation, it was assumed that these values were incorrectly entered because SRP (a fraction of the TP concentration) cannot be higher than TP for the same sample. After reviewing adjacent TP and SRP concentration values, it was assumed that these values were switched when originally entered. The result was a TP concentration of 0.02 mg/L and an SRP concentration of 0.01 mg/L.

5. Sheppard Creek

Nutrient data for Sheppard Creek were very limited. Because of this, data extraction efforts were focused on reviewing all available nutrient data. TP and dissolved phosphorus were both summarized for Sheppard Creek, as were nitrate, total Kjeldahl (TKNT, and nitrate plus nitrite (NN) data. Once extracted, the data were reviewed for all QA issues prior to being included in summary tables.

One SRP sample was removed because the reported concentration was listed as "0" mg/L.

Ten nitrate values were noted as "K" in the results comment field. These values were retained after all values were changed to reflect half of the detection limit. When included in summary tables, these values are flagged and noted as half of the detection limit in the report.

Finally, one NN sample was removed from the dataset because it was listed as "non detect", but no detection limit was provided.

6. Whitefish River

This segment is listed for total nitrogen (TN) and both TN and NN were the focus of data summaries/analyses for this segment. Following DEQ protocols (DEQ 2007), it was determined that parameter codes 600 and 62855 would represent TN. For NN samples, parameter codes 630, 631, and 620 were used. Filtered samples were combined with unfiltered samples. Nitrate (620) was used to supplement the dataset because the nitrate specie makes up a large proportion of NN (with nitrite specie making up a much smaller proportion).

Twenty one nitrate samples were removed from the dataset because NN data for these sites/dates were available. Twenty samples with parameter code 71851 (dissolved nitrate) were removed from the dataset following DEQ protocols (DEQ 2007). Three nitrate samples were removed from the dataset because "0" mg/L was the reported concentration value.

7. Challenge Creek QA

Challenge Creek is listed for TP, but has very limited TP data. Following DEQ protocols (DEQ 2007), it was determined that all available phosphorus species would be assessed. The result was samples with codes 665 and 666.

Two values were listed as "non-detect" and the values were reduced to half of the detection limit and retained in the dataset for data analysis.

8. Stillwater River

Following DEQ protocols (DEQ 2007), it was determined that parameter code 665 would be used to represent TP, 671 and 70507 would represent SRP, and that 618, 620, 630, and 631 would all represent NN. Filtered samples were combined with unfiltered samples. Nitrate (620) was used to supplement the dataset because the nitrate specie makes up a large proportion of NN (with nitrite specie making up a much smaller proportion).

No samples in this dataset were found to be true duplicates.

Twelve values were listed as "non-detect" and the values were reduced to half of the detection limit and retained in the dataset for data analysis. Notes are displayed in the data summary tables in the report. Twenty three samples were removed from the dataset because "0" mg/L was the reported concentration value.

Eleven values were listed as "estimated" because the sample concentration was below detection limits. These eleven values were modified to reflect half of the detection value reported.

Thirty six phosphorus samples reported by RDG were removed as they were suspected of data errors. QA investigation found numerous SRP values reported that were two to four times greater than TP concentrations collected at the same station on the same date.

9. Swift Creek

Following DEQ protocols (DEQ 2007), it was determined that parameter codes 665 and 650 would be used to represent TP, and that 660, 671, and 70507 would represent SRP.

A total of 1,241 samples were found to be true duplicates in the dataset and were removed.

Three SRP and four TP values had the result comment "non-detect" and were modified to reflect half of the detection limit reported. These stations were retained in the database and flagged in the report.

Three samples were listed in ug/L and were converted to mg/L.

Seven samples were removed from the dataset because "0" mg/L was the reported concentration value.

10. Lake Mary Ronan

The lake is listed for *chlorophyll-a*, though all TP, dissolved oxygen, *chlorophyll-a*, and Secchi disc data were extracted. Following DEQ protocols (DEQ 2007), the dataset was reviewed and no data issues were noted. All available data for each parameter are presented because of the limited data at these stations.

11. References

DEQ. 2007. Water Quality Data Grouping Methodology. Organization of Legacy STORET Nutrient and Turbidity Data in Preparation for Spatial Stratification.

Appendix B:
Water Quality Sample Stations

Contents

Tables

1. Ashley Creek

Seventy-seven sample stations are located on Ashley Creek. Forty-three stations have nutrient data and are shown in Table B-1 and Table B-2. Eight stations are located on the upstream listed segment (MT76O002_010) and twenty-seven stations are listed on the downstream listed segment (MT76O002_030).

Table B-1. Stations on Ashley Creek, part 1

Station ID	Station Name	Latitude	Longitude	Impaired Segment	Map Status
293014	below Kalispell	48.146944	-114.28556	Yes - Lower	moved 300' WSW to FLBSAHLYC01
293015	near Kalispell	48.166111	-114.42917	No	moved to 1,100' WSW 12367500
12367000	near Kila MT	48.166624	-114.60097	Yes - Upper	moved 1,000' NW to AC-2
12367500	near Kalispell MT	48.164955	-114.43335	No	*no change*
12367800	at Kalispell MT	48.163846	-114.30124	Yes - Lower	*no change*
5512AS01	at bridge, on Rogers Lake Road	48.096944	-114.54917	Yes - Upper	*no change*
5513AS01	at bridge, upsream from Smith Lake	48.108333	-114.45639	Yes - Upper	moved 1,200' SW to AC-4
5514AS01	at bridge, upstream from Flathead River	48.135	-114.24278	Yes - Lower	*no change*
5611AS01	at Ashley Lake outlet, near Kalispell, MT	48.176389	-114.61333	Yes - Upper	*no change*
5613AS01	at bridge, downstream from Smith Lake	48.150556	-114.43556	No	moved 700' SW to AC-5
5613AS02	at bridge, upstream from forest product company	48.195	-114.37222	No	moved 300' NW to AC-7
5613AS03	at bridge, downstream from forest product company	48.1875	-114.33167	Yes - Lower	*no change*
5614AS01	at USGS gauging station, upstream from storm-water discharge	48.182222	-114.31528	Yes - Lower	*no change*
5614AS02	70 feet downstream from storm-water discharge	48.182222	-114.31278	Yes - Lower	*no change*
5614AS03	just upstream from Kalispell, MT. Sewerage treatment plant (STP) discharge	48.175	-114.3075	Yes - Lower	*no change*
5614AS04	50 feet downstream from Kalispell, MT. Sewerage treatment plant (STP) discharge	48.172778	-114.30806	Yes - Lower	*no change*
5614AS05	400 feet downstream from Kalispell, MT. Sewerage treatment plant (STP) discharge	48.172778	-114.30667	Yes - Lower	*no change*
5614AS06	1.5 miles downstream from Kalispell, MT. Sewerage treatment plant (STP) discharge, at county road	48.164167	-114.29944	Yes - Lower	moved 450' WSW to 12367800
5614AS07	at Highway 93, south of Kalispell, MT	48.146111	-114.28611	Yes - Lower	moved 300' NW to FLBSAHLYC01
5614AS08	at bridge, near Demersville School	48.144167	-114.27278	Yes - Lower	*no change*
5614AS09	1.0 mile upstream from mouth, at County Road	48.145833	-114.21556	Yes - Lower	*no change*

Table B-2. Stations on Ashley Creek, part 2

Station ID	Station Name	Latitude	Longitude	Impaired Segment	Map Status
AC-1	Ashley Creek - 1	48.180051	-114.61802	Yes - Upper	*no change*
AC-2	Ashley Creek - 2	48.167751	-114.6044	Yes - Upper	*no change*
AC-3	Ashley Creek - 3	48.100333	-114.5623	Yes - Upper	*no change*
AC-4	Ashley Creek - 4	48.105501	-114.45948	Yes - Upper	*no change*
AC-5	Ashley Creek - 5	48.149451	-114.43317	No	*no change*
AC-6	Ashley Creek - 6	48.182183	-114.41238	No	*no change*
AC-7	Ashley Creek - 7	48.195183	-114.37332	No	*no change*
AC-8	Ashley Creek - 8	48.182351	-114.32298	Yes - Lower	*no change*
AC-9	Ashley Creek - 9	48.164417	-114.30197	Yes - Lower	moved 250' SW to 12367800
AC-10	Ashley Creek - 10	48.149027	-114.28172	Yes - Lower	*no change*
BSC05023	below STP (EGS)	48.17	-114.29833	Yes - Lower	*no change*
BSC05024	at school house	48.153333	-114.28056	Yes - Lower	moved 2,850' SW to FLBSAHLYC01
BSC05025	at Highway 93	48.1475	-114.28778	Yes - Lower	moved 350' SE to FLBSAHLYC01
BSC05515		48.146389	-114.27139	Yes - Lower	moved 3,750' W to FLBSAHLYC01
BSC05516	above Kalispell STP	48.175833	-114.30861	Yes - Lower	*no change*
C11AHLYC01	at Foys Bend Lane crossing	48.1464	-114.27334	Yes - Lower	*no change*
C11AHLYC02	at Cemetary Road crossing	48.16434	-114.29966	Yes - Lower	moved 400' SW to 12367800
C11AHLYC03	immediately upstream of WWTP	48.17543	-114.30929	Yes - Lower	*no change*
C11AHLYC04	near Smith Lake	48.1467	-114.4361	No	*no change*
FBC05003	downstream from the Kalispell sewerage treatment plant (STP)	48.144722	-114.28944	Yes - Lower	moved 1,000' NE to FLBSAHLYC01
FLBSAHLYC01	downstream from Kalispell STP			Yes - Lower	*no change*
FLBSAHLYC02	below Kalispell STP outfall	48.17	-114.3013	Yes - Lower	*no change*

2. Challenge Creek

Three sample stations are located on Challenge Creek (MT67I002_040) and are shown in Table B-3.

Table B-3. Stations on Challenge Creek

Station	Station Name	Latitude	Longitude	Map Status
C07CHLGC02	above USFS Road 569 crossing	48.23156	-113.3314	*no change*
FL6005	13 mi ENE Essex, MT	48.231111	-113.32083	moved 2,550' NNW to 150' downstream of unnamed tributary that is 4,650' upstream of mouth
GLAC_NURE_569	Challenge Creek (Determined by GIS)	48.228003	-113.33265	*no change*

3. Fish Creek

Eleven sample stations are located on two different streams named Fish Creek. Seven of the stations are located on the Fish Creek that is listed as impaired (MT76O002_50); the other four stations are located on a Fish Creek in Glacier National Park. Six of the stations on the 303(d)-listed Fish Creek are shown in Table B-1. The seventh station (Org ID = PIBO, Station ID = 155, Station Name = 036-19-I) has no nutrient data.

Table B-4. Stations on Fish Creek

Station ID	Station Name	Latitude	Longitude	Map Status
5611FI01	at Ashley Lake Road near Marion, MT	48.1916667	-114.6405556	moved 1,700' W to bridge
C11FISHC10	100 yards upstream from Ashley Lake Road crossing	48.1912694	-114.6476619	moved 300' NE to bridge
FC01	Fish Creek - 1	48.20413	-114.68411	*no change*
FC02	Fish Creek - 2	48.19425	-114.66811	*no change*
FC03	Fish Creek - 3	48.19195	-114.64837	moved 250' ENE to bridge
FL8009	Fish C trib. Ashley Lake 6 mi N Marion, MT	48.19194444	-114.6036111	plotting error; unable to display on map

4. Sheppard Creek

Six sample stations are located on Sheppard Creek (MT76P001_050). One station (Org ID = PIBO, Station ID = 166, Station Name = 037-18-I) has no nutrient data. The five stations with nutrient data are shown in Table B-5.

Table B-5. Stations on Sheppard Creek

Station	Station Name	Latitude	Longitude	Map Status
5810SH01	downstream from well #1, near Kalispell, MT	48.376111	-114.73111	moved 2,300' N to creek
C09SHEPC01		48.3816	-114.7461	*no change*
C09SHEPC02	1/4 mile upstream of FR 538 bridge crossing	48.38104	-114.74994	*no change*
C09SHEPC03	just upstream of mouth	48.37168	-114.68123	*no change*
FL8003	19 mi W Whitefish MT	48.382222	-114.75528	moved 1,350' ESE to C09SHEPC02

5. Spring Creek

Twenty-one sample stations are located on various streams named Spring Creek. Seven of the stations are located on the Spring Creek that is listed as impaired (MT76O002_040). Eight stations are located on a Spring Creek that flows through the eastern portion of the city of Kalispell. One station is located on a Spring Creek in the Glacier National Park and another station is located on a Spring Creek (a.k.a. unnamed tributary) in the Swan River watershed. The seven stations on the 303(d)-listed Spring Creek are shown in Table B-2.

Table B-6. Stations on Spring Creek

Station ID	Station Name	Latitude	Longitude	Map Status
C11SPRGC10	0.25 mi below spring source	48.22405	-114.38071	*no change*
C11SPRGC20	lower upstream and across street from Skippers	48.200161	-114.33571	*no change*
C11SPRGC30	below highway behind Hampton Inn	48.19832	-114.33115	*no change*
C11SPRGC31	downstream from west Spring Creek Road	48.22517	-114.3834	*no change*
SPC01	Spring Creek - 1	48.21975	-114.37311	*no change*
SPC02	Spring Creek - 2	48.20611	-114.35139	*no change*
SPC03	Spring Creek - 3	48.19973	-114.33603	moved 200' NE to C11SPRGC20

6. Stillwater River

Twenty-four sample stations are located on the Stillwater River and are shown in Table B-5 and Table B-6. Eighteen stations are located on the impaired segment of the Stillwater River (MT76P001_010) and one of those stations (481214114165101) has no nutrients data. Six station ID's are shown as duplicated in Table B-5 and Table B-6 because RDG sampled DEQ stations and provided different station names and geographic coordinates.

Table B-7. Stations on Stillwater River, part 1

Station ID	Station Name	Latitude	Longitude	Impaired Segment	Map Status	Report Status
12363920	at Olney MT	48.53552086	-114.5718088	No	not displayed	REMOVED; not impaired
12365000	near Whitefish MT	48.31885196	-114.3873575	Yes	moved 550' NW to 5813ST01	retained
12365500	near Kalispell MT	48.28278478	-114.3538616	Yes	*no change*	retained
12365700	at Lawrence Park, at Kalispell	48.21746037	-114.3131865	Yes	*no change*	retained
481214114165101	at Conrad Bridge nr Kalispell MT	48.20384856	-114.2817959	Yes	*no change*	REMOVED; no nutrient data
5614ST01	at Seventh Street bridge, in Kalispell, MT, near mouth	48.2091667	-114.3066667	Yes	moved 400' N to 5614ST03	retained
5614ST02	downstream from Whitefish River, near Kalispell, MT	48.2047222	-114.2783333	Yes	moved 500' SE to 481214114165101	retained
5614ST03	Site #2, near mouth	48.2069444	-114.3033333	Yes	moved 1,450' NW to RDG location	retained
5614ST03	Whitefish Stage Road [*DEQ station sampled by RDG]*	48.21014	-114.307	Yes	no change	retained
5813ST01	near Whitefish, MT	48.3188889	-114.3880556	Yes	moved 400' NNW to RDG location	retained
5813ST01	Spring Prarie (USGS Gage) *[DEQ station sampled by RDG]*	48.31975	-114.38917	Yes	*no change*	retained
5912ST01	near Whitefish, MT	48.4488889	-114.4841667	Yes*	*misplotted; moved to RDG location	REMOVED; not impaired
5912ST01	State Land Access *[DEQ station sampled by RDG]*	48.50333	-114.53881	No	not displayed	REMOVED; not impaired
5912ST02	near Olney, MT	48.4663889	-114.5072222	Yes	misplotted to 5912ST04; moved to RDG location	retained
5912ST02	Twin Bridges *[DEQ station sampled by RDG]*	48.38642	-114.43211	Yes	*no change*	retained
5912ST04	Site #1, downstream from Stillwater Lake	48.4658333	-114.5091667	Yes	moved 550' NE to RDG location	retained
5912ST04	Farm to Market Road *[DEQ station sampled by RDG]*	48.46719	-114.508	Yes	*no change*	retained
6012ST01	at Olney MT	48.5355556	-114.5694444	No	not displayed	REMOVED; not impaired
6023ST01	Good Creek Road *[DEQ station sampled by RDG]*	48.53556	-114.57192	No	not displayed	REMOVED; not impaired
CHURCH	Church Road	48.28247	-114.35189	Yes	moved 500' NW to 12365500	retained

Table B-8. Stations on Stillwater River, part 2

FBC04022	STILLWATER RIVER ABOVE CONFLUENCE W FLATHEAD R	48.2008333	-114.2877778	Yes	moved 1,850' NE to 481214114165101	retained
FBC04022	Conrad Street Bridge *[DEQ station sampled by RDG]*	48.20375	-114.28186	Yes	no change	retained
FLBSSTILR01	Stillwater River above confluence with Flathead River	48.2008333	-114.2877778	Yes	moved 1,850' NE to 481214114165101	retained
MARTIN	Martin Camp Road	48.48667	-114.52036	No	not displayed	REMOVED; not impaired

7. Swift Creek

Nine sample stations are located on Swift Creek (MT76P003_020) and are shown in Table B-5. Data for five stations (STSF05, STSF06, WWSSWFTC05, WWSSWFTC06, and WWSSWFTC07) were acquired from a watershed characterization report produced by PBS & J; geographic coordinates for these stations were not provided. Stations without geographic coordinates ("n/a" in Table B-5) were manually plotted in GIS via visual estimation by using a map that PBS & J provided: The actual locations of these stations could be a few hundred feet upstream or downstream of their estimated locations.

Table B-9. Stations on Swift Creek

Station	Station Name	Latitude	Longitude	Map Status
3016D1		48.48333333	-114.4305556	moved 400' WSW to 12365800
12365800	near Whitefish MT	48.48302088	-114.4320812	*no change*
5913SW01	near Whitefish, MT	48.4830556	-114.4316667	moved 100' W to 12365800
C09SWFTC01	Lower at bridge	48.4831	-114.4311	moved 250' W to 12365800
STSF05	Middle Swift Creek	n/a	n/a	plotted 2,000' upstream of first unnamed tributary on the east side of Swift Creek downstream of Chicken Creek
STSF06	Lower Swift Creek	n/a	n/a	plotted at 12365800
WWSSWFTC05	Upper Swift Creek mainstem	n/a	n/a	plotted on mainstem below confluence of East Fork and West Fork
WWSSWFTC06	Middle Swift Creek	n/a	n/a	plotted 2,000' upstream of first unnamed tributary on the east side of Swift Creek downstream of Chicken Creek
WWSSWFTC07	Lower Swift Creek	n/a	n/a	plotted at 12365800

8. Whitefish River

Twenty-six sample stations are located on the Whitefish River (MT76P003_010) and are shown in Table B-6 and Table B-7. Nineteen stations have nutrients data. The four stations without nutrients data were not included in the analyses in this report. These four stations had more accurate geographic coordinates than other nearby stations and nearby stations were grouped to their locations, which are shown in Table B-6 and Table B-7.

Table B-10. Stations on Whitefish River, part 1

Station	Station Name	Latitude	Longitude	Map Status	Report Status
3016A1		48.41111111	-114.3416667	moved to US-93 bridge	retained
12366000	near Kalispell, MT	48.320241	-114.278464	*no change*	retained
12366080	nr mouth at Kalispell, MT	48.2266275	-114.2923525	moved 250' SW to WFREVERGN	retained
5614WH01	1.0 mile upstream from Stillwater River, at Evergreen Drive Bridge, near mouth	48.2227778	-114.2941667	moved 1,200' NNE to WFREVERGN	retained
5614WH02	near mouth	48.2155556	-114.2833333	moved 850' NW to WFRWESTWD	retained
5614WH03	Site #3, near mouth	48.2169444	-114.2841667	moved 1,400' NW to WFRWESTWD	retained
5714WH01	at Birch Grove Road bridge, near mouth	48.2911111	-114.2955556	moved 1,550' ESE to WFRBIRCHGV	retained
5814WH01	at USGS gage station, near Kalispell, MT	48.3202778	-114.2675	moved 2,650' W to 12366000	retained
5814WH03	downstream from noname discharge	48.3633333	-114.2633333	plotting error; unable to display on map	retained
5814WH04	upstream from noname discharge	48.3633333	-114.2633333	plotting error; unable to display on map	retained
5814WH05	on east bank, downstream from Highway 40 bridge	48.3691667	-114.2883333	moved 3,500' NW to WFRHWY40	retained
5814WH06	Site #2, at Highway 40 bridge	48.3686111	-114.2888889	moved 3,500' NW to WFRHWY40	retained
5913WH01	at Whitefish, MT	48.4108333	-114.3438889	moved 150' E to US-93 bridge	retained
5913WH06	at Whitefish Lake outlet, 300 feet upstream from railroad trestle	48.4155556	-114.3480556	moved 900' SW to bridge	retained
5913WH07	Site #1, at Whitefish Lake outlet	48.4141667	-114.35	moved 300' W to bridge	retained
C09WHTFR01	N of Kalispell on Terrault Rd N of bridge	48.3204396	-114.2795965	moved 300' SSE to 12366000	retained

Table B-11. Stations on Whitefish River, part 2

Station	Station Name	Latitude	Longitude	Map Status	Report Status
WFRBIRCHGR	below bridge Birch Grove Lane, north of Kalispell, MT	48.2565	-114.2872	moved to correct location	REMOVED; no nutrient data
WFREVERGN	below bridge on Evergreen Drive, just north of Kalispell, MT in Evergreen, MT	48.2259	-114.2923	*no change*	REMOVED; no data
WFRHOGSON	below bridge on Hogson Road, North of Kalispell, MT	48.3419	-114.2739	*no change*	REMOVED: no nutrient data
WFRHWY40	below bridge on Highway 40, East of Whitefish, MT	48.3712	-114.3026	*no change*	retained
WFRJPROAD	below bridge on JP Road south of Whitefish, MT	48.3856	-114.3295	*no change*	retained
WFROUTLET	at Whitefish Lake Outlet three meters downstream from lake edge	48.4155	-114.3539	moved 850' SE to bridge	retained
WFRRESERVE	below bridge on Reserve Drive, just north of Kalispell, MT in Evergreen, MT	48.2404	-114.2924	*no change*	REMOVED; no nutrient data
WFRROSEXIN	below bridge on Rose Crossing Lane, north of Kalispell, MT	48.2911	-114.2892	moved to correct location	retained
WFRTETRAUL	above bridge on Tetrault Road, at United States Geological Survey Gaging Station 12366000, north of Kalispell, MT	48.3206	-114.2783	moved 150' SSW to 12366000	retained
WFRWESTWD	below bridge on Westwood Lane just north of Kalispell, MT in Evergreen, MT	48.2188	-114.2859	*no change*	retained

Appendix C.
Ashley Creek Water Quality Summary Tables

Tables

Acronyms and Abbreviations

avg	average (i.e., arithmetic mean)
DEQ	Montana Department of Environmental Quality
DNNC	draft nutrient numeric criteria
max	maximum
mg/L	milligram per liter (i.e., parts per million)
min	minimum
MTWTRSHD	an organizational code that represents many entities that upload data to STORET
n/a	not available or not applicable
std	standard (i.e., water quality numeric criterion)
STORET	STOrage and RETrieval Data Warehouse (U.S. Environmental Protection Agency)

Table C-1. Summary of total phosphorus data for the upper listed segment on Ashley Creek

Station	No. of samples	Begin	End	Min	Max	Avg	>DNNC [a]
AC-1	19	10/16/2002	9/21/2005	0.008	0.450	0.036	11%
5611AS01	5	5/27/1976	9/16/1976	0.010	0.200	0.058	67%
AC-2	19	10/16/2002	9/21/2005	0.008	0.049	0.015	22%
AC-3	19	10/16/2002	9/21/2005	0.009	0.640	0.049	78%
5512AS01	18	4/28/1976	9/13/1978	0.010	0.200	0.056	100%
AC-4	19	10/16/2002	9/21/2005	0.015	0.430	0.052	100%
5513AS01	18	4/28/1976	9/13/1978	0.020	0.400	0.068	67%

Units are mg/L.
Stations are listed upstream to downstream from top to bottom.
a. DNNC for Ashley Creek is 0.012 mg/L (DEQ 2009) and is only applicable from July 1st through September 30th.

Table C-2. Summary of soluble reactive phosphorus data for the upper listed segment on Ashley Creek

Station	No. of samples	Begin	End	Min	Max	Avg
AC-1	19	10/16/2002	9/21/2005	0.001	0.035	0.005
5611AS01	1	6/17/1974	6/17/1974	0.010	0.010	0.010
AC-2	19	10/16/2002	9/21/2005	0.001	0.018	0.004
AC-3	19	10/16/2002	9/21/2005	0.002	0.018	0.004
5512AS01	11	6/28/1978	9/13/1978	0.010	0.020	0.014
AC-4	19	10/16/2002	9/21/2005	0.004	0.017	0.011
5513AS01	11	6/28/1978	9/13/1978	0.010	0.030	0.017

Units are mg/L.
Stations are listed upstream to downstream from top to bottom.

Table C-3. Summary of total phosphorus data for the lower listed segment on Ashley Creek

Station	No. of samples	Begin	End	Min	Max	Avg	>DNNC [a]
5613AS03	13	6/28/1978	9/13/1978	0.020	0.110	0.060	100%
AC-8	17	6/17/2003	9/21/2005	0.024	0.059	0.038	100%
5614AS01	13	6/29/1978	9/11/1978	0.030	0.130	0.063	100%
5614AS02	5	8/15/1978	9/11/1978	0.040	0.070	0.058	100%
5614AS03	66	3/22/1973	8/7/1996	0.020	0.700	0.075	100%
BSC05516	1	4/1/1985	4/1/1985	0.110	0.110	0.110	100%
C11AHLYC03	1	8/2/2004	8/2/2004	0.057	0.057	0.057	100%
5614AS04	11	6/29/1978	9/11/1978	0.310	1.600	0.748	100%
5614AS05	49	6/29/1978	9/11/1978	0.090	1.900	0.670	100%
BSC05023	3	4/28/1984	4/23/1985	0.010	0.010	0.010	0%
12367800	14	7/8/1969	12/10/2007	0.035	1.600	0.364	100%
5614AS06	23	3/22/1973	8/7/1996	0.018	7.300	1.008	100%
AC-9	17	6/17/2003	9/21/2005	0.037	0.087	0.063	100%
C11AHLYC02	1	8/2/2004	8/2/2004	0.086	0.086	0.086	100%
293014	8	4/22/1969	8/1/1970	0.030	0.870	0.255	100%
5614AS07	6	7/26/1978	11/29/1994	0.039	1.990	0.586	100%
FBC05003	108	4/29/1984	1/22/1993	0.010	1.680	0.320	96%
AC-10	1	6/17/2003	6/17/2003	0.091	0.091	0.091	100%
BSC05515	16	1/31/1984	4/24/1985	0.098	1.040	0.494	100%
FLBSAHLYC01 [b]	112	3/22/1988	7/6/2006	0.015	1.228	0.142	100%
FLBSAHLYC01 [c]	114	2/3/1994	6/16/2007	0.008	0.197	0.061	100%
5614AS08	11	6/29/1978	9/11/1978	0.230	0.470	0.361	100%
C11AHLYC01	1	8/2/2004	8/2/2004	0.075	0.075	0.075	100%
BSC05024	6	11/12/1984	8/26/1985	0.010	0.010	0.010	0%
5514AS01	13	3/22/1973	9/11/1978	0.280	1.800	0.551	100%
5614AS09	10	4/28/1976	8/29/1994	0.035	1.040	0.530	100%

Units are mg/L.
Stations are listed upstream to downstream from top to bottom.
a. DNNC for Ashley Creek is 0.012 mg/L (DEQ 2009) and is only applicable from July 1st through September 30th.
b. Data obtained directly from the Flathead Lake Biological Station
c. Data reported in STORET from the organization MTWTRSHD.

Table C-4. Summary of soluble reactive phosphorus data for the lower listed segment on Ashley Creek

Station	No. of samples	Begin	End	Min	Max	Avg
5613AS03	13	6/28/1978	9/13/1978	0.010	0.050	0.025
AC-8 [a]	17	6/17/2003	9/21/2005	0.005	0.028	0.012
5614AS01	13	6/29/1978	9/11/1978	0.020	0.070	0.027
5614AS02	5	8/15/1978	9/11/1978	0.020	0.060	0.036
5614AS03	61	3/22/1973	8/29/1994	0.010	0.080	0.024
5614AS04	11	6/29/1978	9/11/1978	0.260	9.900	1.421
5614AS05	50	6/29/1978	9/11/1978	0.030	1.900	0.572
12367800	10	3/28/2007	12/10/2007	0.010	0.037	0.016
5614AS06	23	3/22/1973	11/29/1994	0.004	4.850	0.615
AC-9	17	6/17/2003	9/21/2005	0.005	0.045	0.028
293014	4	4/22/1969	7/9/1969	0.080	0.470	0.248
5614AS07	6	7/26/1978	11/29/1994	0.020	1.880	0.548
293014	10	10/30/1968	8/1/1970	0.010	1.020	0.268
FBC05003	62	1/31/1984	11/17/1988	0.060	1.970	0.444
AC-10	1	6/17/2003	6/17/2003	0.022	0.022	0.022
FLBSAHLYC01 [b]	133	10/29/1987	7/6/2006	0.001	1.453	0.095
FLBSAHLYC01 [c]	102	2/3/1994	6/13/2001	0.001	0.071	0.016
FLBSAHLYC01 [c]	12	10/11/2006	6/16/2007	0.001	0.071	0.018
5614AS08	11	6/29/1978	9/11/1978	0.150	0.390	0.305
5514AS01	12	3/22/1973	9/11/1978	0.250	0.710	0.390
5614AS09	4	8/22/1984	8/29/1994	0.007	0.670	0.279

Units are mg/L.

Stations are listed upstream to downstream from top to bottom.

a. The concentration at AC-8 on 6/17/2003 was reported as 0.18 mg/L. After further investigation, this value was assumed to be a typo (refer to Appendix A for details) and was changed to 0.018 mg/L.

b. Data obtained directly from the Flathead Lake Biological Station

c. Data reported in STORET from the organization MTWTRSHD.

Table C-5. Summary of total nitrogen data for Ashley Creek

Station	No. of samples	Begin	End	Min	Max	Avg	>DNNC [a]
AC-1	1	9/21/2005	9/21/2005	1.500	1.500	1.500	100%
AC-2	1	9/21/2005	9/21/2005	1.400	1.400	1.400	100%
AC-3	1	9/21/2005	9/21/2005	1.400	1.400	1.400	100%
AC-4	1	9/21/2005	9/21/2005	1.300	1.300	1.300	100%
C11AHLYC04	6	5/26/2007	9/19/2007	0.570	0.990	0.717	100%
AC-5	1	9/21/2005	9/21/2005	1.700	1.700	1.700	100%
AC-6	1	9/21/2005	9/21/2005	1.700	1.700	1.700	100%
AC-7	1	9/21/2005	9/21/2005	1.700	1.700	1.700	100%
AC-8	1	9/21/2005	9/21/2005	1.500	1.500	1.500	100%
12367800	10	3/28/2007	12/10/2007	0.950	3.170	1.716	100%
AC-9	1	9/21/2005	9/21/2005	4.700	4.700	4.700	100%
FBC05003	65	9/21/1987	1/22/1993	0.650	8.800	2.535	100%
FLBSAHLYC01 [b]	122	10/29/1987	7/6/2006	0.805	7.560	2.339	100%
FLBSAHLYC01 [c]	114	2/3/1994	6/16/2007	0.588	4.216	1.406	100%

Units are mg/L.
Stations are listed upstream to downstream from top to bottom.
Segments (upper, middle, and lower) are separated by bold lines.
a. DNNC for Ashley Creek is 0.233 mg/L (DEQ 2009) and is only applicable from July 1st through September 30th.
b. Data obtained directly from the Flathead Lake Biological Station
c. Data reported in STORET from the organization MTWTRSHD.

Table C-6. Summary of nitrate plus nitrite data for Ashley Creek

Station	No. of samples	Begin	End	Min	Max	Avg	>DNNC [a]
AC-1	19	10/16/2002	9/21/2005	0.0025 [b]	0.0025 [b]	0.0025 [b]	0%
AC-2	19	10/16/2002	9/21/2005	0.0025 [b]	0.0025 [b]	0.0025 [b]	0%
AC-3	19	10/16/2002	9/21/2005	0.0025 [b]	0.100	0.015	0%
5512AS01	12	6/28/1978	9/13/1978	0.0025 [b]	0.030	0.012	0%
AC-4	19	10/16/2002	9/21/2005	0.0025 [b]	0.0025 [b]	0.0025 [b]	0%
5513AS01	12	6/28/1978	9/13/1978	0.0025 [b]	0.010	0.006	0%
C11AHLYC04	6	5/26/2007	9/19/2007	0.0025 [b]	0.010	0.006	0%
5613AS01	12	6/28/1978	9/13/1978	0.0025 [b]	0.010	0.006	0%
AC-5	19	10/16/2002	9/21/2005	0.0025 [b]	0.0025 [b]	0.0025 [b]	0%
293015	4	5/7/1970	8/1/1970	0.030	0.120	0.065	0%
AC-6	17	6/17/2003	9/21/2005	0.0025 [b]	0.020	0.005	0%
5613AS02	12	6/28/1978	9/13/1978	0.010	0.090	0.036	0%
AC-7	15	6/17/2003	9/21/2005	0.0025 [b]	0.050	0.011	0%
5613AS03	13	6/28/1978	9/13/1978	0.0025 [b]	0.080	0.027	0%
AC-8	17	6/17/2003	9/21/2005	0.0025 [b]	0.070	0.008	0%
5614AS01	13	6/29/1978	9/11/1978	0.0025 [b]	0.110	0.028	8%
5614AS02	5	8/15/1978	9/11/1978	0.0025 [b]	0.170	0.045	20%
5614AS03	60	12/23/1975	8/7/1996	0.0025 [b]	0.350	0.025	2%
C11AHLYC03	1	8/2/2004	8/2/2004	0.030	0.030	0.030	0%
5614AS04	11	6/29/1978	9/11/1978	0.0025 [b]	1.000	0.129	30%
5614AS05	50	6/29/1978	9/11/1978	0.0025 [b]	0.140	0.043	8%
5614AS06	22	12/23/1975	8/7/1996	0.040	1.130	0.366	93%
12367800	10	3/28/2007	12/10/2007	0.371	2.380	1.030	100%
AC-9	17	6/17/2003	9/21/2005	0.570	3.930	1.726	100%
C11AHLYC02	1	8/2/2004	8/2/2004	1.910	1.910	1.910	100%
293014	4	5/7/1970	8/1/1970	0.040	0.170	0.080	0%
5614AS07	6	7/26/1978	11/29/1994	0.0025 [b]	3.330	1.371	75%
FLBSAHLYC01 [c]	132	1/21/1988	7/6/2006	0.068	6.282	1.241	100%
FLBSAHLYC01 [d]	114	2/3/1994	6/16/2007	0.054	3.519	0.778	100%
FBC05003	92	4/2/1984	1/22/1993	0.010	5.600	0.731	89%
AC-10	1	6/17/2003	6/17/2003	0.650	0.650	0.650	n/a
5614AS08	11	6/29/1978	9/11/1978	0.560	1.000	0.694	100%
C11AHLYC01	1	8/2/2004	8/2/2004	0.690	0.690	0.690	100%
5514AS01	11	6/29/1978	9/11/1978	0.280	1.800	0.635	100%
5614AS09	4	8/22/1984	8/29/1994	0.0025 [b]	0.920	0.243	0%

Units are mg/L.
Stations are listed upstream to downstream from top to bottom.
Segments (upper, middle, and lower) are separated by bold lines.
a. DNNC for Ashley Creek is 0.081 mg/L (DEQ 2009) and is only applicable from July 1st through September 30th. An "n/a" means that no samples were collected during the applicable time period.
b. Sample value presented is half of reported detection limit.
c. Data obtained directly from the Flathead Lake Biological Station
d. Data reported in STORET from the organization MTWTRSHD.

Table C-7. Summary of total Kjeldahl nitrogen data for Ashley Creek

Station	No. of samples	Begin	End	Min	Max	Avg
AC-1	19	10/16/2002	9/21/2005	0.050	1.500	0.341
5611AS01	5	5/27/1976	9/16/1976	0.500	0.500	0.500
AC-2	19	10/16/2002	9/21/2005	0.050	1.600	0.337
AC-3	19	10/16/2002	9/21/2005	0.044	3.300	0.496
5512AS01	11	4/28/1976	9/13/1978	0.120	0.710	0.455
AC-4	19	10/16/2002	9/21/2005	0.250	1.300	0.456
5513AS01	12	4/28/1976	9/13/1978	0.500	1.100	0.680
5613AS0	12	4/28/1976	9/13/1978	0.500	1.700	0.962
AC-5	19	10/16/2002	9/21/2005	0.300	1.700	0.758
293015	8	4/22/1969	8/1/1970	0.100	0.900	0.424
AC-6	17	6/17/2003	9/21/2005	0.380	1.700	0.765
5613AS02	6	7/28/1978	9/13/1978	0.700	1.300	0.942
AC-7	15	6/17/2003	9/21/2005	0.460	1.700	0.762
5613AS03	6	7/28/1978	9/13/1978	0.480	1.000	0.768
AC-8	17	6/17/2003	9/21/2005	0.490	1.500	0.735
5614AS01	6	7/29/1978	9/11/1978	0.670	1.200	0.947
5614AS02	4	8/15/1978	9/11/1978	0.700	1.300	0.970
5614AS03	28	4/28/1976	8/7/1996	0.200	2.000	0.860
BSC05516	1	4/1/1985	4/1/1985	0.650	0.650	0.650
C11AHLYC03	1	8/2/2004	8/2/2004	0.800	0.800	0.800
5614AS05	16	7/29/1978	9/11/1978	1.400	4.300	2.806
5614AS06	12	7/29/1978	8/7/1996	0.300	17.500	3.175
AC-9	17	6/17/2003	9/21/2005	0.580	1.800	0.981
C11AHLYC02	1	8/2/2004	8/2/2004	0.900	0.900	0.900
293014	8	4/22/1969	8/1/1970	0.100	1.960	0.823
5614AS07	5	8/22/1984	11/29/1994	0.700	3.000	1.500
FBC05003	44	1/31/1984	8/31/1987	0.040	3.740	1.434
5614AS08	5	7/20/1978	9/11/1978	0.710	1.300	1.060
BSC05515	14	1/31/1984	4/1/1985	0.630	3.740	1.956
C11AHLYC01	1	8/2/2004	8/2/2004	1.000	1.000	1.000
5514AS01	5	7/29/1978	9/11/1978	0.920	1.600	1.208
5614AS09	10	4/28/1976	8/29/1994	0.300	2.200	1.050
5614AS04	5	7/29/1978	9/11/1978	1.900	4.100	3.200

Units are mg/L.
Stations are listed upstream to downstream from top to bottom.
Segments (upper, middle, and lower) are separated by bold lines.

Table C-8. Summary of dissolved oxygen data for Ashley Creek

Station	No. of samples	Begin	End	Min	Max	Avg	< Std [a]
AC-1	1	9/21/2005	9/21/2005	4.5	4.5	4.5	0%
5611AS01	5	5/27/1976	9/16/1976	8.6	10.2	9.1	0%
AC-2	1	9/21/2005	9/21/2005	5.7	5.7	5.7	0%
AC-3	1	9/21/2005	9/21/2005	5.7	5.7	5.7	0%
5512AS01	16	4/28/1976	9/13/1978	8.1	11.6	9.1	0%
AC-4	1	9/21/2005	9/21/2005	4.6	4.6	4.6	0%
5513AS01	17	4/28/1976	9/13/1978	2.9	11.0	6.1	29%
C11AHLYC04	6	5/26/2007	9/19/2007	5.2	12.6	7.8	0%
5613AS01	27	1/29/1973	9/13/1978	3.6	10.8	6.5	7%
AC-5	1	9/21/2005	9/21/2005	6.1	6.1	6.1	0%
293015	9	11/13/1968	8/1/1970	7.5	12.6	9.1	0%
12367500	4	7/8/1969	4/14/1970	2.3	11.4	8.0	25%
AC-6	1	9/21/2005	9/21/2005	5.7	5.7	5.7	0%
5613AS02	11	6/28/1978	9/13/1978	4.7	8.9	7.5	0%
AC-7	1	9/21/2005	9/21/2005	6.2	6.2	6.2	0%
5613AS03	11	6/28/1978	9/13/1978	7.6	9.3	8.5	0%
AC-8	1	9/21/2005	9/21/2005	4.8	4.8	4.8	0%
5614AS01	12	6/29/1978	9/11/1978	4.5	9.1	6.9	0%
5614AS02	4	8/15/1978	9/11/1978	6.1	7.9	7.1	0%
5614AS03	18	3/22/1973	11/15/1984	5.3	12.9	8.8	0%
C11AHLYC03	1	8/2/2004	8/2/2004	1.8	1.8	1.8	100%
5614AS04	11	6/29/1978	9/11/1978	5.3	76.0	12.9	0%
5614AS05	11	6/29/1978	9/11/1978	5.4	8.6	6.7	0%
FLBSAHLYC02	6	4/20/2007	6/16/2007	7.2	11.1	8.8	0%
12367800	14	7/8/1969	12/10/2007	1.6	14.7	8.5	14%
5614AS06	16	3/22/1973	11/29/1994	2.5	10.7	6.2	7%
AC-9	1	9/21/2005	9/21/2005	6.2	6.2	6.2	0%
C11AHLYC02	1	8/2/2004	8/2/2004	2.6	2.6	2.6	100%
293014	10	10/30/1968	8/1/1970	3.3	10.0	6.7	20%
5614AS07	3	8/22/1984	11/29/1994	7.1	12.0	9.1	0%
FLBSAHLYC01	201	10/29/1987	7/6/2006	2.0	13.5	9.4	2%
FLBSAHLYC01	7	10/11/2006	3/26/2007	8.1	12.8	10.9	0%
5614AS08	11	6/29/1978	9/11/1978	4.1	7.4	5.8	0%
5514AS01	11	3/22/1973	9/11/1978	3.2	8.6	5.1	45%
5614AS09	8	4/28/1976	11/15/1984	3.0	12.3	7.5	13%

Units are mg/L.
Stations are listed upstream to downstream from top to bottom.
Segments (upper, middle, and lower) are separated by bold lines.
a. The dissolved oxygen minimum standard is 4.0 mg/L.

Appendix D.

Maps of Synoptic Water Quality Data

Figures

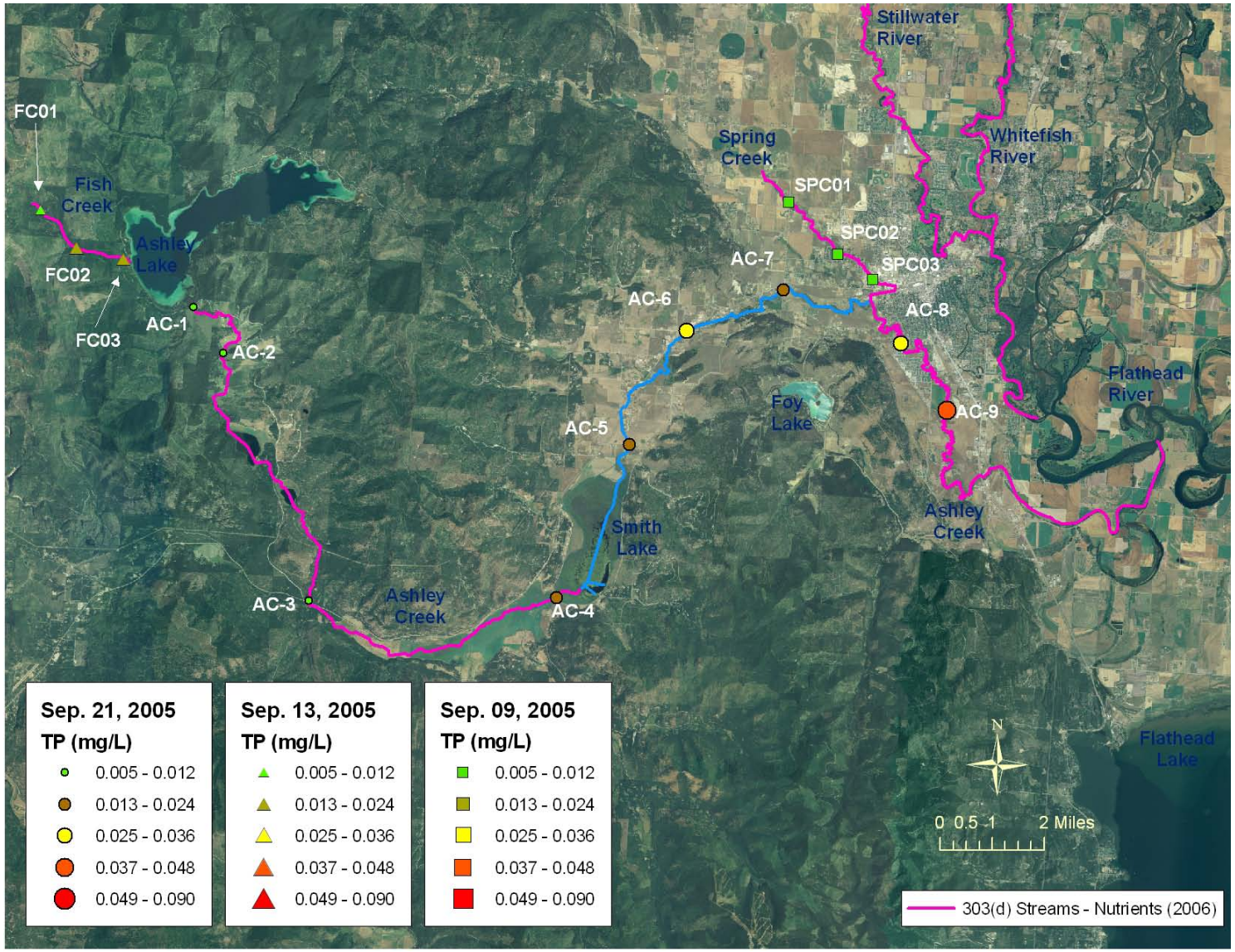

Figure D-1. Synoptic sampling of total phosphorus on Ashley Creek, Fish Creek, and Spring Creek (September 2005).

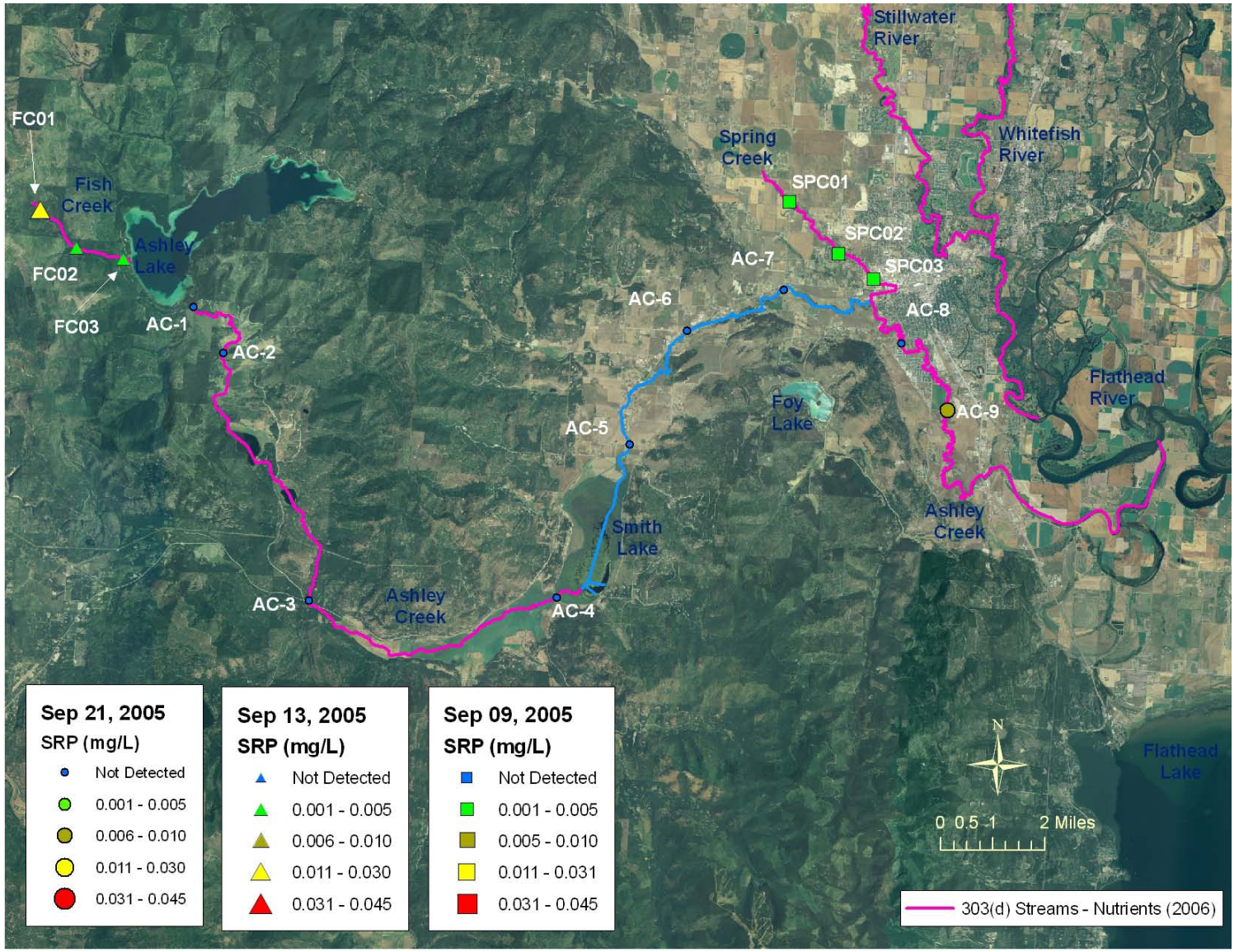

Figure D-2. Synoptic sampling of soluble reactive phosphorus on Ashley Creek, Fish Creek, and Spring Creek (September 2005).

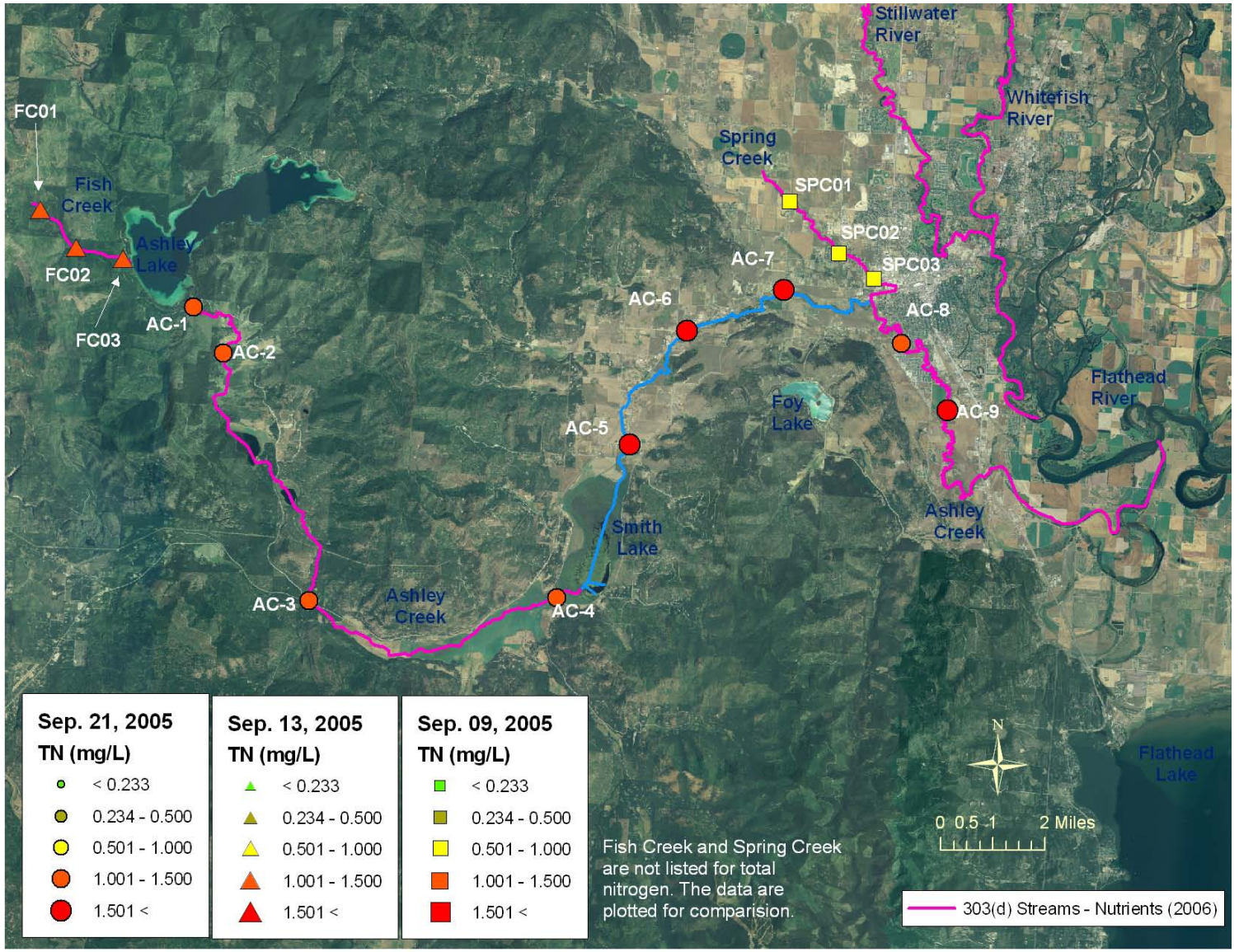

Figure D-3. Synoptic sampling of total nitrogen on Ashley Creek, Fish Creek, and Spring Creek (September 2005).

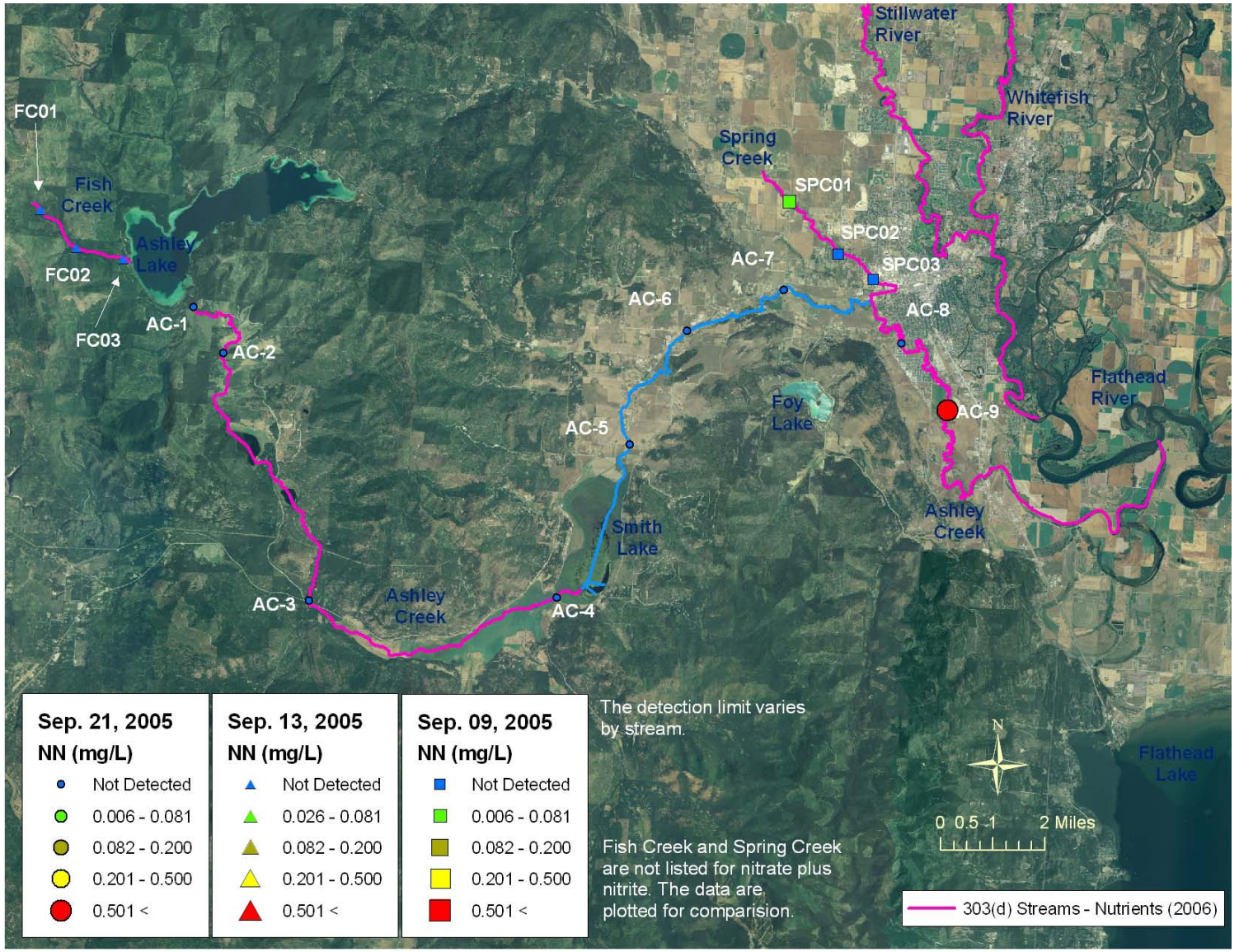

Figure D-4. Synoptic sampling of nitrate plus nitrite on Ashley Creek, Fish Creek, and Spring Creek (September 2005).

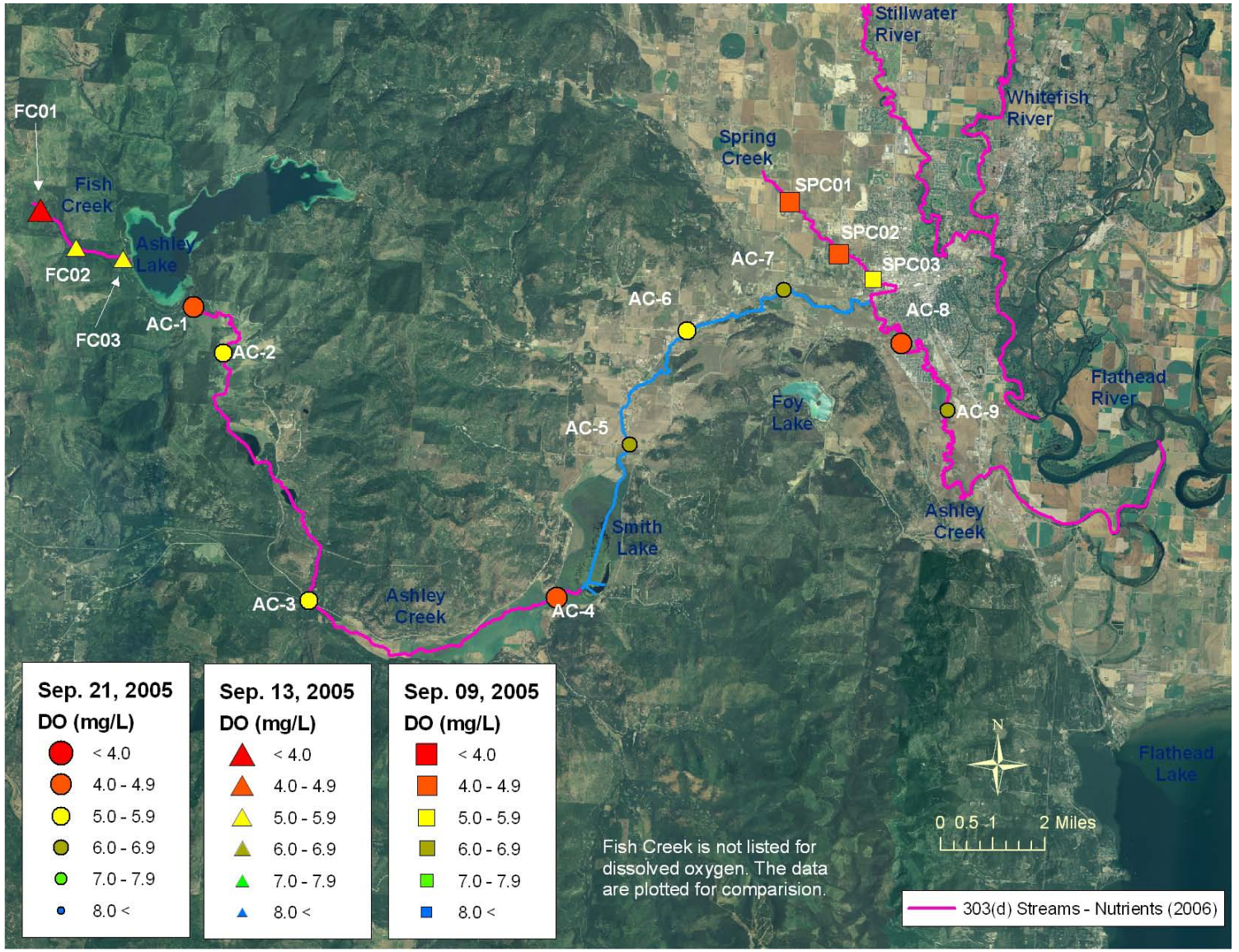

Figure D-5. Synoptic sampling of dissolved oxygen on Ashley Creek, Fish Creek, and Spring Creek (September 2005).

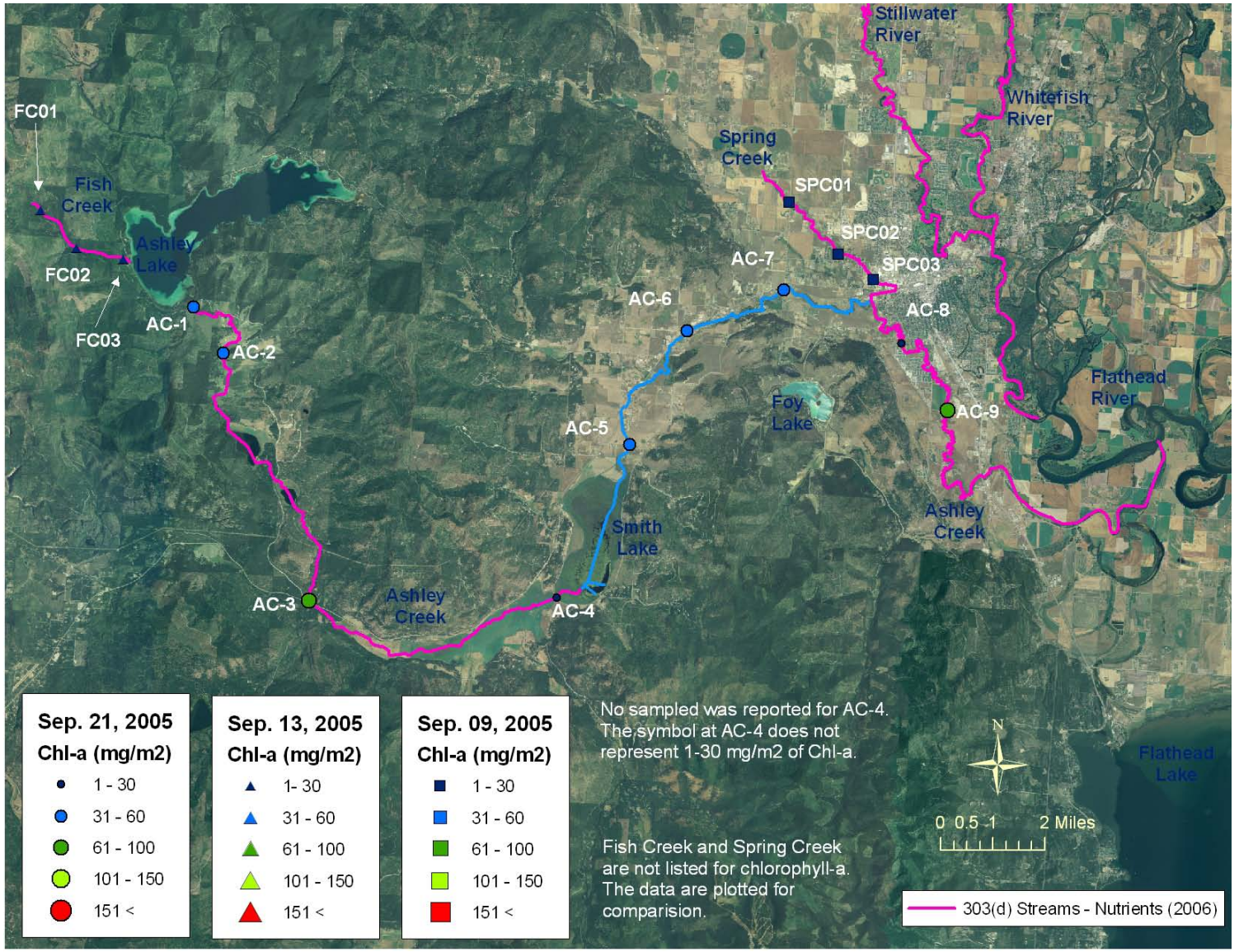

Figure D-6. Synoptic Sampling of chlorophyll-*a* on Ashley Creek, Fish Creek, and Spring Creek (September 2005).

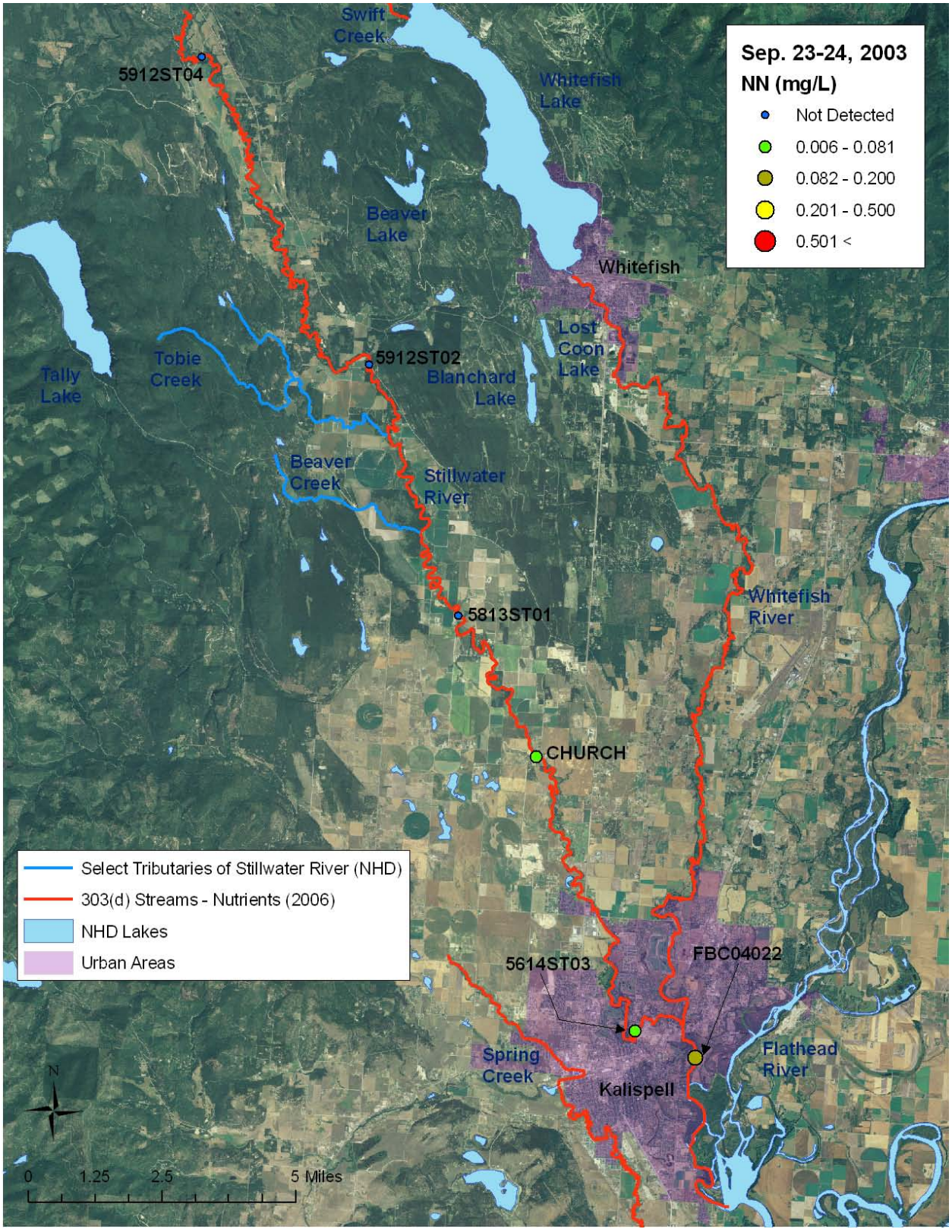

Figure D-7. Synoptic sampling of nitrate plus nitrite on the Stillwater River (September 2003).

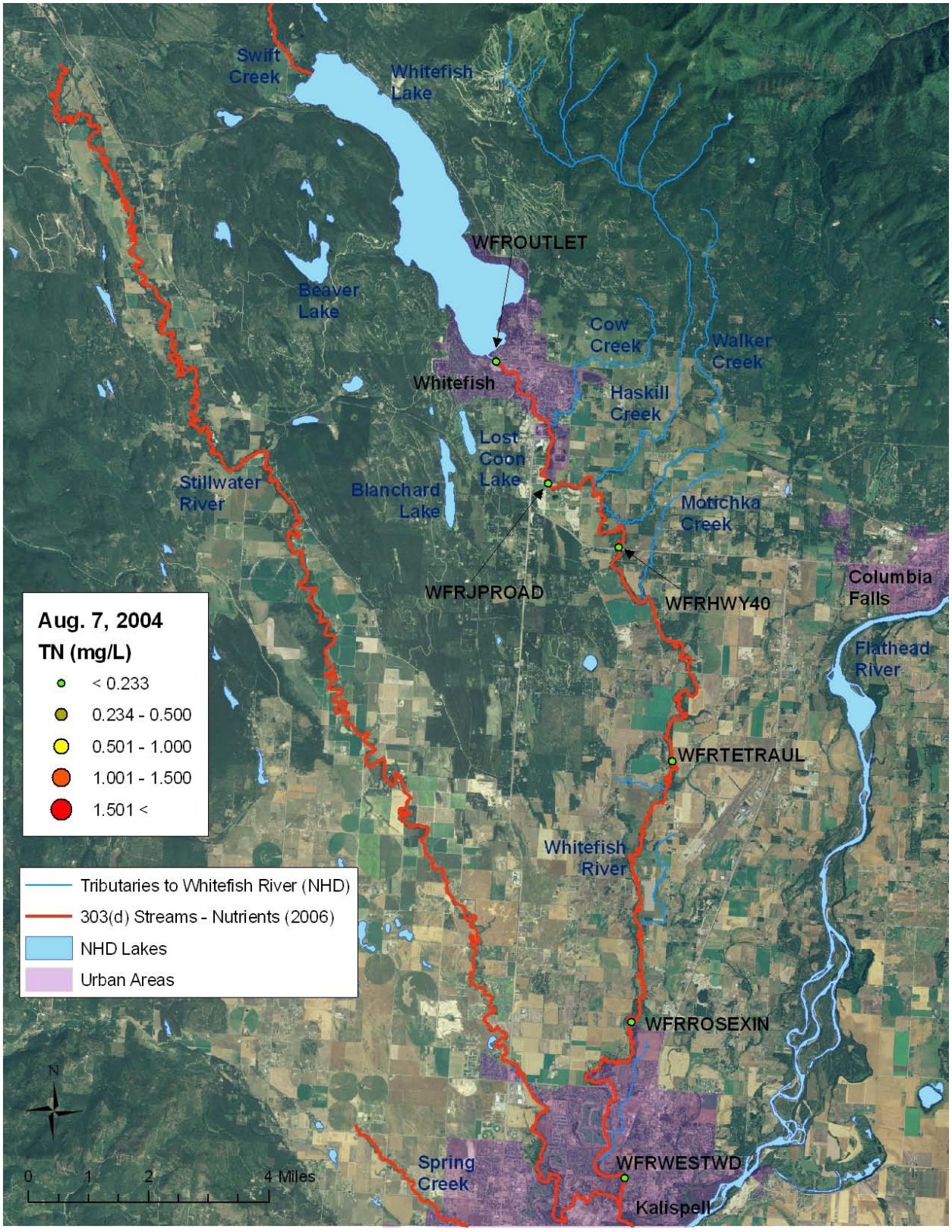

Figure D-8. Synoptic sampling of total nitrogen on the Whitefish River (August 7, 2004).