Table 2. Reference conditions for aggregate ecoregion XIV streams.

Parameter	No. of Streams N ++	Reported values		25th Percentiles based on all seasons data for the Decade	Reference Streams **
		Min	Max	P25-all seasons+	P75 - all seasons
TKN (mg/L)	340	0.05	3.22	0.37	
NO_2 + NO_3 (mg/L)	292	0.02	7.46	0.07	
TN (mg/L) - calculated	NA	0.07	10.68	0.44	
TN (mg/L) - reported	56	0.24	4.08	0.71	
TP (*u*g/L)	375	1.25	1525.0	31.25	
Turbidity (NTU)	39	0.84	21.13	1.94	
Turbidity (FTU)	221	0.65	76.50	3.04	
Turbidity (JCU)	11	2.06	33.5	3.88	
Chlorophyll *a* (*u*g/L) -F	20	0.25	21.31	0.44	
Chlorophyll *a* (*u*g/L) -S	53	0	125.17	3.75	
Chlorophyll *a* (*u*g/L) -T	–	–	–	--	
Periphyton Chl *a* (mg/m^2)					

P25: 25th percentile of all data
P75: 75th percentile of all data
** as determined by the Regional Technical Assistance Groups (RTAGs)
\+ Median for all seasons' 25th percentiles. E.g. this value was calculated from four seasons' 25th percentiles. If the seasonal 25th percentile (P25) TP values are - spring 10μg/L, summer 15μg/L, fall 12μg/L, and winter 5μg/L, the median value of all seasons P25 will be 11μg/L.
++ N = largest value reported for a decade / Season.
TN calculated is based on the sum of TKN + NO_2+NO_3.
TN reported is actual TN value reported in the database for one sample.
F Chlorophyll *a* measured by Fluorometric method with acid correction.
S Chlorophyll *a* measured by Spectrophotometric method with acid correction.
T Chlorophyll *a b c* measured by Trichromatic method.
NA Not Applicable
zz calculated medians from less than 3 seasons' data.

Tables 3a-c present potential reference conditions for rivers and streams in the Level III subecoregions within the Aggregate Ecoregion. Note that the footnotes for Table 2 apply to Tables 3a-c.

Table 3a. Reference conditions for level III ecoregion 59 streams.

Parameter	No. of Streams N ++	Reported values		25th Percentiles based on all seasons data for the Decade	Reference Streams **
		Min	Max	P25-all seasons+	P75 - all seasons
TKN (mg/L)	71	0.05	1.45	0.30	
$NO_2 + NO_3$ (mg/L)	41	0.10	4.12	0.31	
TN (mg/L) - calculated	NA	0.15	5.57	0.61	
TN (mg/L) - reported	14	0.40	2.13	0.57	
TP (*u*g/L)	87	2.50	907.50	23.75	
Turbidity (NTU)	23	0.84	2.58	1.68	
Turbidity (FTU)	33	0.75	6.13	1.26	
Turbidity (JCU)	--	--	--	--	
Chlorophyll *a* (*u*g/L) -F	--	--	--	--	
Chlorophyll *a* (*u*g/L) -S	--	--	--	--	
Chlorophyll *a* (*u*g/L) -T	--	--	--	--	
Periphyton Chl *a* (mg/m^2)	--	--	--	--	

Table 3b. Reference conditions for level III ecoregion 63 streams.

Parameter	No. of Streams N ++	Reported values		25th Percentiles based on all seasons data for the Decade	Reference Streams **
		Min	Max	P25-all seasons+	P75 - all seasons
TKN (mg/L)	207	0.10	3.10	0.51	
$NO_2 + NO_3$ (mg/L)	190	0.002	7.46	0.04	
TN (mg/L) - calculated	NA	0.102	10.56	0.55	
TN (mg/L) - reported	31	0.50	4.08	0.87	
TP (*u*g/L)	223	2.5	1525	52.5	
Turbidity (NTU)	16	2.03	21.13	3.89	
Turbidity (FTU)	169	1.13	76.50	4.50	
Turbidity (JCU)	9	2.06	33.50	4.73	
Chlorophyll *a* (*u*g/L) -F	22	0.25	21.31	0.44	
Chlorophyll *a* (*u*g/L) -S	50	0	125.17	3.75	
Chlorophyll *a* (*u*g/L) -T	--	--	--	--	
Periphyton Chl *a* (mg/m^2)	--	--	--	--	

Table 3c. Reference conditions for level III ecoregion 84 streams.

Parameter	No. of Streams N ++	Reported values		25th Percentiles based on all seasons data for the Decade	Reference Streams **
		Min	Max	P25-all seasons+	P75 - all seasons
TKN (mg/L)	62	0.05	2.26	0.24	
NO_2 + NO_3 (mg/L)	61	0.01	5.09	0.24	
TN (mg/L) - calculated	NA	0.06	7.35	0.48	
TN (mg/L) - reported	11	0.24	2.18	0.48	
TP (*u*g/L)	65	2.5	276.25	6.88	
Turbidity (NTU)	--	--	--	--	
Turbidity (FTU)	19	0.75	31.2	1.78	
Turbidity (JCU)	2	3.0	5.01	3.0	
Chlorophyll *a* (*u*g/L) -F	--	--	--	--	
Chlorophyll *a* (*u*g/L) -S	3	3.09	16.58	3.09 z	
Chlorophyll *a* (*u*g/L) -T	--	--	--	--	
Periphyton Chl *a* (mg/m^2)	--	--	--	--	

Definitions used in filling Tables 2 and 3 - Reference Condition tables

1. Number of Streams in Table 2 refers to the largest number of streams and rivers for which data existed for a given season within an aggregate nutrient ecoregion.

2. Number of Streams in Table 3 refers to the number of streams and rivers for which data existed for the summer months since summer is generally when the greatest amount of nutrient sampling is conducted. If another season greatly predominates, notification is made (s=spring, f=fall, w=winter).

3. Medians. All values (min, max, and 25th percentiles) included in the table are based on waterbody medians. All data for a particular parameter within a stream for the decade were reduced to one median for that stream. This prevents over-representation of individual waterbodies with a great deal of data versus those with fewer data points within the statistical analysis.

4. 25th percentile for all seasons is calculated by taking the median of the 4 seasonal 25th percentiles. If a season is missing, the median was calculated with 3 seasons of data. If less than 3 seasons were used to derive the median, the entry is flagged **(z).**

5. A 25th percentile for a season is best derived with data from a minimum of 4 streams/season. However, this table provides 25th percentiles that were derived with less than 4 streams/season in order to retain all information for all seasons. In calculating the 25th percentile for a season with less than 4 stream medians, the statistical program automatically used the minimum value within the less-than-4 population. If less than 4 streams were used in developing a seasonal quartile and or all-seasons median, the entry is flagged **(zz).**

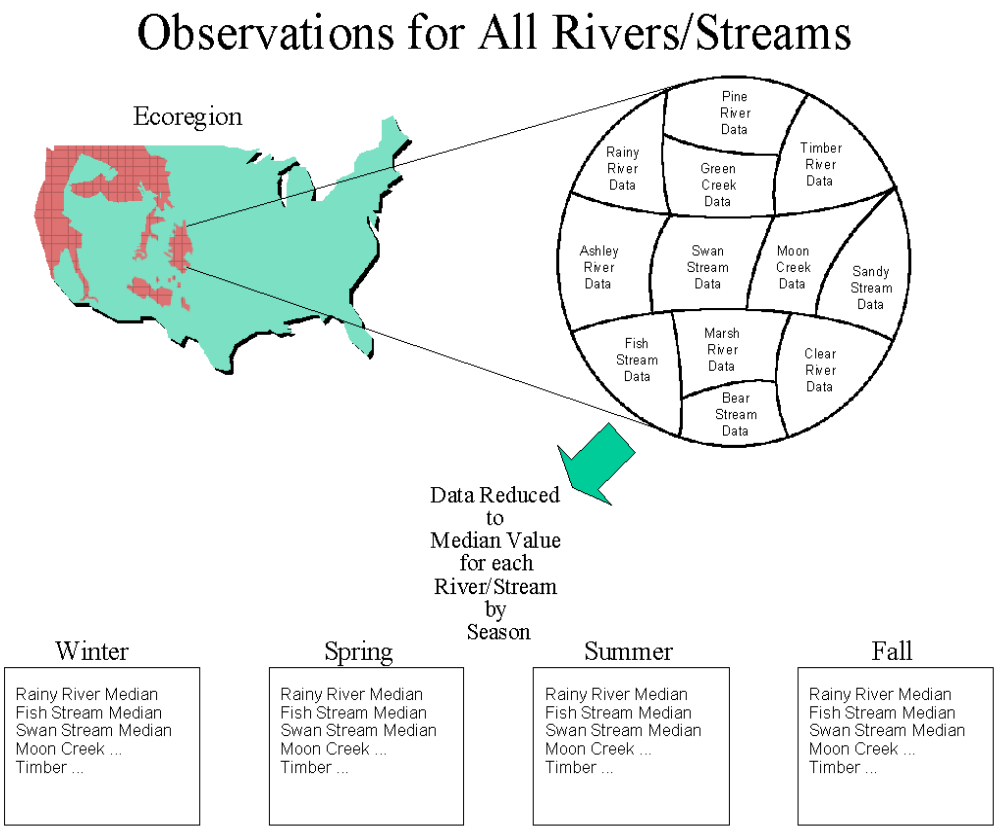

Figure 4a. Illustration of data reduction process for stream data.

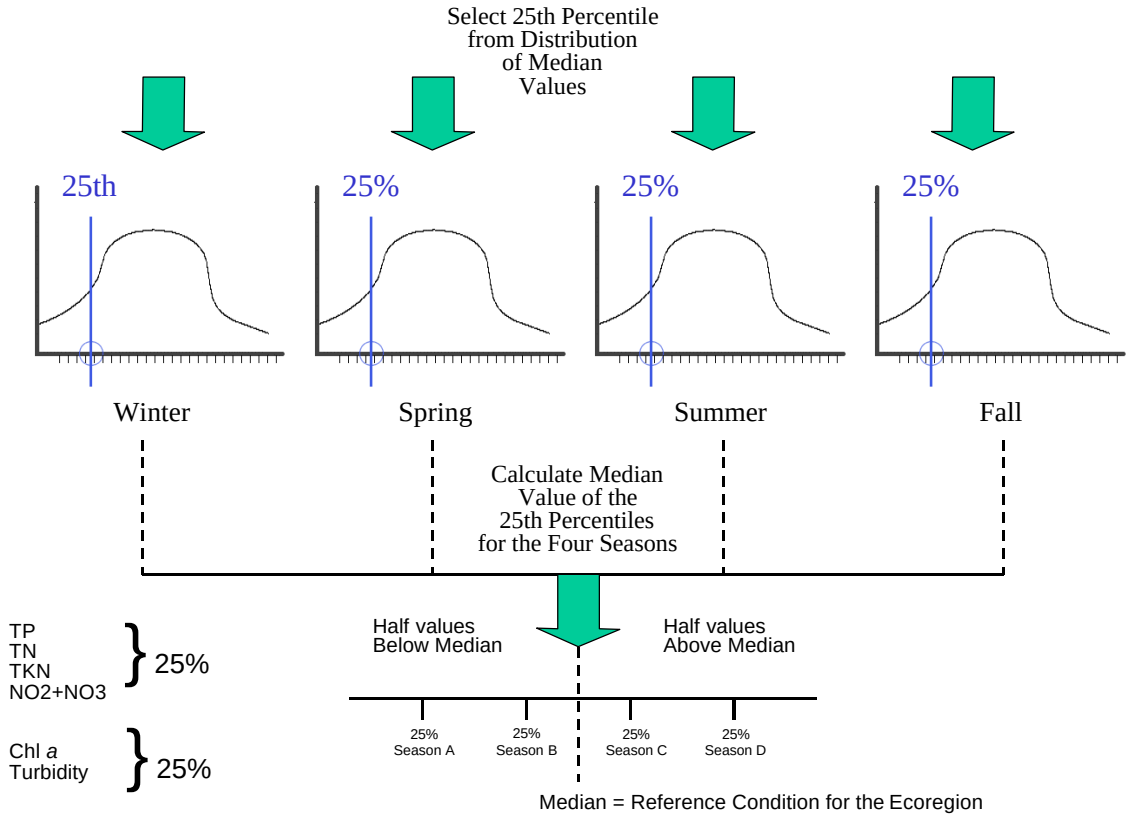

Figure 4b.Illustration of reference condition calculation.

Preferred Data Choices and Recommendations When Data Are Missing

1. Where data are missing or are very low in total records for a given parameter, use 25th percentiles for parameters within an adjacent, similar subecoregion within the same aggregate nutrient ecoregion **or** when a similar subecoregion can not be determined, use the the 25th percentile for the Aggregate ecoregion or consider the **lowest** 25th percentile from a subecoregion (level III) within the aggregate nutrient ecoregion. The rationale being that without data, one may assume that the subecoregion in question may be as sensitive as the most sensitive subecoregion within the aggregate.

2. TN calculated: When reported Total Nitrogen (TN) median values are lacking or very low in comparison to TKN and Nitrate/Nitrite-N values, the medians for TKN and nitrite/nitrate-N were added, resulting in a calculated TN value. The number of samples (N) for calculated TN is not filled in since it is represented by two subsamples of data: TKN and nitrite/nitrate-N. Therefore, N/A is placed in this box.

3. TN reported: This is the median based on reported values for TN from the database.

4. Chlorophyll *a*: Medians based on all methods are reported, however, the acid corrected medians are preferred to the uncorrected medians. In developing a reference condition from a particular method, it is recommended that the method with the most observations be used. Fluorometric and Spectrophotometric are preferred over all other methods. However, when no data exist for Fluorometric and Spectrophotometric methods, Trichromatic values may be used. Data from the variance techniques are not interchangeable.

5. Periphyton: Where periphyton data exist, record them separately For periphyton-dominated streams, a measure of periphyton chlorophyll is a more appropriate response variable than planktonic chlorophyll *a*. See Table 4, p. 101 of the Rivers and Streams Nutrient Technical Guidance Manual (U. S. EPA, 2000b) for values of periphyton and planktonic chlorophyll *a* related to eutrophy in streams.

6. Secchi depth: The 75th percentile is reported for Secchi depth since this is the only variable for which the value of the parameter **increases** with greater clarity. (For lakes and reservoirs only.)

7. Turbidity units: All turbidity units from all methods are reported. FTUs and NTUs are preferred over JCUs. If FTUs and NTUs do not exist, use JCUs. These units are not interchangeable. Turbidity is chosen as a response variable in streams since it can be an indicator of increasing algal biomass due to nutrient enrichment. See pages 32 -33 of the Rivers and Streams Nutrient Technical Guidance Manual for a discussion of turbidity and correlations with algal growth.

8. Lack of data: A dash (-) represents missing, inadequate, or inconclusive data. A zero (0) is reported if the reported median for a parameter is 0 or if the component value is below detection.

5.0 REFERENCE SITES AND CONDITIONS IN AGGREGATE ECOREGION XIV

Reference conditions represent the natural, least impacted conditions or what is considered to be the most attainable conditions. This section compares the different reference conditions determined from the two methods and establishes which reference condition is most appropriate.

A priori determination of reference sites. The preferred method for establishing reference condition is to choose the upper percentile of an *a priori* population of reference streams. States and Tribes are encouraged to identify reference conditions based on this method.

Statistical determination of reference conditions (25th percentile of entire database.) See Tables 2 and 3a-c in section 4.0.

RTAG discussion and rationale for selection of reference sites and conditions in Ecoregion VI. The RTAG should compare the results derived from the two methods described above and present a rationale for the final selection of reference sites.

6.0 MODELS USED TO PREDICT OR VERIFY RESPONSE PARAMETERS

The RTAG is encouraged to identify and apply relevant models to support nutrient criteria development. The following are three scenarios under which models may be used to derive criteria or support criteria development.

- Models for predicting correlations between causal and response variables
- Models used to verify reference conditions based on percentiles
- Regression models used to predict reference conditions in impacted areas

7.0 FRAMEWORK FOR REFINING RECOMMENDED NUTRIENT CRITERIA FOR RIVERS AND STREAMS IN AGGREGATE ECOREGION XIV

Information on each of the following six weight of evidence factors is important to refine the criteria presented in this document. All elements should be addressed in developing criteria, as is expressed in our nutrient criteria technical guidance manuals. It is our expectation that EPA Regions, States, and Tribes (as RTAGs) will consider these elements as States/Tribes develop their criteria. This section should be viewed as a work sheet (sections are left blank for this purpose) to assist in the refinement of nutrient criteria. If many of these elements are ultimately unaddressed, EPA may rely on the proposed reference conditions presented in Tables 3a-c and other literature and information readily available to the HQ nutrient team to develop nutrient water quality recommendations for this ecoregion.

7.1 Example Worksheet for Developing Aggregate Ecoregion and Subecoregion Nutrient Criteria

- *Literature sources*

- *Historical data and trends*

- *Reference condition*

- *Models*

- *RTAG expert review and consensus*

- *Downstream effects*

7.2 Tables of Refined Nutrient Water Quality Criteria for Aggregate Ecoregion XIV and Level III Subecoregions for TP, TN, Chl *a*, Turbidity (where sufficient data exist)

Aggregate Ecoregion XIV- Eastern Coastal Plain	**Proposed Criterion**
Total Phosphorus (µg/L)	
Total Nitrogen (mg/L)	
Chlorophyll *a* (µg/L or mg/m^2)	
Turbidity (NTU or other units)	
Other (Index; other parameter such as DO)	

- *Literature sources*

- *Historical data and trends*

- *Reference condition*

- *Models*

- *RTAG expert review and consensus*

- *Downstream effects*

Ecoregion #59-Northeastern Coastal Zone	Proposed Criterion
Total Phosphorus (µg/L)	
Total Nitrogen (mg/L)	
Chlorophyll *a* (µg/L or mg/m^2)	
Turbidity (NTU or other units)	
Other (Index; other parameter such as DO)	

7.3 Setting Seasonal Criteria

The recommendations presented in this document are based in part on medians of all the 25th percentile seasonal data (decadal), and as such are reflective of all seasons and not one particular season or year. It is recommended that States and Tribes monitor in all seasons to best assess compliance with the resulting criterion. States/Tribes may choose to develop criteria which reflect **each** particular season or a **given year** when there is significant variability between seasons/years or designated uses that are specifically tied to one or more seasons of the year (e.g., recreation, fishing). Using the tables in Appendix A and B, one can set reference conditions based on a particular season or year and then develop a criterion based on each individual season. Obviously, this option is season-specific and would also require increased monitoring within each season to assess compliance.

7.4 When Data/Reference Conditions are Lacking

When data are unavailable to develop a reference condition for a particular parameter(s) within a subecoregion, EPA recommends one of three options: (1) Use data from a similar neighboring subecoregion (e.g., if data are few or nonexistent for the northern cascades, consider using the data and reference condition developed for the cascades); or (2) Use the 25th perecentiles for the Aggregate ecoregion; or (3) Consider using the lowest of the yearly medians for that parameter calculated for all the subecoregions within the Aggregate Ecoregion.

7.5 Site-Specific Criteria Development

Criteria may be refined in a number of ways. The best way to refine criteria is to follow the critical elements of criteria development as well as to refer to the Rivers and Streams Nutrient Criteria Technical Guidance Manual (U.S. EPA, 2000b). The Technical Guidance Manual presents sections on each of the following factors to consider in setting criteria:

- refinements to ecoregions (Section 2.3)
- classification of waterbodies (Chapter 2)

- setting seasonal criteria to reflect major seasonal climate differences and accounting for significant or cyclical precipitation events (high flow/low flow conditions) (Chapter 4).

8.0 LITERATURE CITED

NYSDEC (New York State Department of Environment and Conservation). 2000. Memorandum from Scott Kishbaugh to Jay Bloomfield, September 26, 2000, regarding reference lakes for nutrient criteria.

TNDEC (Tennessee Department of Environment and Conservation). 2000. Letter to Geoff Grubbs, October 5, 2000, containing comments on draft nutrient criteria recommendations.

U.S. EPA. 2000a. Nutrient Criteria Technical Guidance Manual: Lakes and Reservoirs, U.S. Environmental Protection Agency, Washington, DC. EPA-822-B00-001.

U.S. EPA. 2000b. Nutrient Criteria Technical Guidance Manual: Rivers and Streams, U.S. Environmental Protection Agency, Washington, DC. EPA-822-B00-002.

9.0 APPENDICES

A. Descriptive Statistics Data Tables for Aggregate Ecoregion

B. Descriptive Statistics Data Tables for Level III Subecoregions within Aggregate Ecoregion

C. Quality Control/Quality Assurance Rules

APPENDIX A

Descriptive Statistics Data Tables for Aggregate Ecoregion

Aggregate Nutrient Ecoregion: XIV
Rivers and Streams
Descriptive Statistics by Decade and Season
Parameter Chla_Fluor_ug_L_Median

SEASON	N	MEAN	MIN	MAX	STDDEV	STDERR	CV	P5	P25	MEDIAN	P75	P95
FALL	17	5.24	.250	55.00	13.7	3.32	261	0.25	0.25	0.63	2.00	55.0
SPRING	19	1.92	.250	5.00	1.38	0.32	72	0.25	0.63	1.90	3.00	5.00
SUMMER	22	4.62	.250	23.50	4.79	1.02	104	0.25	2.00	4.00	6.00	8.00
WINTER	16	2.14	.250	19.13	4.66	1.17	218	0.25	0.25	0.63	1.63	19.1

Aggregate Nutrient Ecoregion: XIV
Rivers and Streams
Descriptive Statistics by Decade and Season
Parameter Chla_Phyto_Spec_A_ug_L_Median

SEASON	N	MEAN	MIN	MAX	STDDEV	STDERR	CV	P5	P25	MEDIAN	P75	P95
FALL	46	17.8	.000	103.33	24.9	3.67	139	0.25	4.50	9.61	16.4	82.5
SPRING	48	15.7	.000	99.00	24.2	3.50	155	0.25	3.00	6.62	11.8	80.0
SUMMER	53	27.5	.000	151.19	26.8	3.69	97	0.25	10.3	20.5	37.0	74.5
WINTER	39	16.6	.250	147.00	35.8	5.74	216	0.25	2.63	4.24	8.07	139

Aggregate Nutrient Ecoregion: XIV
Rivers and Streams
Descriptive Statistics by Decade and Season
Parameter Chla_Phyto_Spec_U_ug_L_Median

SEASON	N	MEAN	MIN	MAX	STDDEV	STDERR	CV	P5	P25	MEDIAN	P75	P95
FALL	0	.	.	.	.	.	.	.	.	.	.	.
SPRING	0	.	.	.	.	.	.	.	.	.	.	.
SUMMER	3	12.4	2.80	27.20	13.0	7.51	105	2.80	2.80	7.20	27.2	27.2
WINTER	0	.	.	.	.	.	.	.	.	.	.	.

Aggregate Nutrient Ecoregion: XIV
Rivers and Streams
Descriptive Statistics by Decade and Season
Parameter Chla_Tric_U_ug_L_Median

SEASON	N	MEAN	MIN	MAX	STDDEV	STDERR	CV	P5	P25	MEDIAN	P75	P95
FALL	14	33.1	1.59	115.62	37.2	9.95	112	1.59	3.31	12.7	45.3	116
SPRING	15	22.8	.290	125.37	37.2	9.60	163	0.29	3.85	11.0	18.4	125
SUMMER	15	29.5	1.70	117.39	32.3	8.35	110	1.70	6.13	16.5	51.0	117
WINTER	13	15.3	1.40	78.27	24.0	6.66	157	1.40	2.85	6.47	8.55	78.3

Aggregate Nutrient Ecoregion: XIV
Rivers and Streams
Descriptive Statistics by Decade and Season
Parameter DIP_ug_L_Median

SEASON	N	MEAN	MIN	MAX	STDDEV	STDERR	CV	P5	P25	MEDIAN	P75	P95
FALL	36	1095	.000	22000.0	4343	724	397	3.75	9.50	23.1	52.5	15E3
SPRING	35	777	.000	14000.0	3092	523	398	0.00	5.00	12.5	35.0	12E3

SUMMER	36	1388	.000	30000.0	5723	954	412	3.75	9.38	30.0	45.0	18E3
WINTER	35	526	.000	9250.00	2030	343	386	2.50	6.25	20.0	35.0	8000

Aggregate Nutrient Ecoregion: XIV 6
Rivers and Streams
Descriptive Statistics by Decade and Season
Parameter DO_mg_L_Median

SEASON	N	MEAN	MIN	MAX	STDDEV	STDERR	CV	P5	P25	MEDIAN	P75	P95
FALL	1	10.3	10.3	10.25	.	.	.	10.3	10.3	10.3	10.3	10.3
SPRING	1	10.0	10.0	10.00	.	.	.	10.0	10.0	10.0	10.0	10.0
SUMMER	1	8.50	8.50	8.50	.	.	.	8.50	8.50	8.50	8.50	8.50
WINTER	1	11.5	11.5	11.50	.	.	.	11.5	11.5	11.5	11.5	11.5

Aggregate Nutrient Ecoregion: XIV 7
Rivers and Streams
Descriptive Statistics by Decade and Season
Parameter NO2_NO3_mg_L_Median

SEASON	N	MEAN	MIN	MAX	STDDEV	STDERR	CV	P5	P25	MEDIAN	P75	P95
FALL	295	0.73	.000	6.90	1.15	0.07	158	0.01	0.04	0.19	0.96	3.19
SPRING	304	0.73	.003	7.99	1.09	0.06	150	0.01	0.09	0.26	0.91	2.92
SUMMER	292	0.63	.000	6.93	0.98	0.06	154	0.01	0.05	0.23	0.76	2.40
WINTER	274	0.88	.003	8.90	1.22	0.07	138	0.01	0.09	0.39	1.15	3.35

Aggregate Nutrient Ecoregion: XIV 8
Rivers and Streams
Descriptive Statistics by Decade and Season
Parameter Orthophosphate_T_as_P_ug_L_Med

SEASON	N	MEAN	MIN	MAX	STDDEV	STDERR	CV	P5	P25	MEDIAN	P75	P95
FALL	24	34.5	5.00	290.00	57.8	11.8	168	5.00	5.00	20.0	31.9	75.0
SPRING	24	23.9	5.00	90.00	21.6	4.41	90	5.00	10.0	15.0	32.5	72.5
SUMMER	24	41.0	5.00	280.00	60.5	12.3	147	5.00	8.75	25.0	42.0	155
WINTER	24	26.3	5.00	140.00	29.6	6.03	112	5.00	11.9	20.0	25.0	80.0

Aggregate Nutrient Ecoregion: XIV 9
Rivers and Streams
Descriptive Statistics by Decade and Season
Parameter TKN_mg_L_Median

SEASON	N	MEAN	MIN	MAX	STDDEV	STDERR	CV	P5	P25	MEDIAN	P75	P95
FALL	360	0.61	.050	2.40	0.38	0.02	62	0.11	0.38	0.55	0.80	1.24
SPRING	338	0.66	.010	3.91	0.48	0.03	73	0.16	0.36	0.57	0.84	1.40
SUMMER	340	0.78	.050	4.15	0.51	0.03	66	0.28	0.45	0.66	0.94	1.68
WINTER	329	0.58	.050	2.53	0.37	0.02	64	0.12	0.34	0.50	0.71	1.33

Aggregate Nutrient Ecoregion: XIV
Rivers and Streams
Descriptive Statistics by Decade and Season
Parameter TN_mg_L_Median

SEASON	N	MEAN	MIN	MAX	STDDEV	STDERR	CV	P5	P25	MEDIAN	P75	P95
FALL	53	1.28	.200	3.29	0.70	0.10	54	0.34	0.79	1.17	1.80	2.59
SPRING	40	1.20	.200	3.88	0.81	0.13	67	0.38	0.67	1.06	1.41	3.28
SUMMER	56	1.34	.270	4.29	0.87	0.12	65	0.35	0.75	1.16	1.70	3.31
WINTER	39	1.33	.300	4.33	0.92	0.15	69	0.35	0.68	1.12	1.74	3.68

Aggregate Nutrient Ecoregion: XIV
Rivers and Streams
Descriptive Statistics by Decade and Season
Parameter TP_ug_L_Median

SEASON	N	MEAN	MIN	MAX	STDDEV	STDERR	CV	P5	P25	MEDIAN	P75	P95
FALL	380	101	.000	1450.00	159	8.16	158	2.50	30.0	60.0	110	328
SPRING	354	86.8	2.50	1600.00	111	5.91	128	3.75	32.5	61.3	100	245
SUMMER	375	137	2.50	2300.00	233	12.0	170	10.0	40.0	80.0	140	455
WINTER	334	73.5	.000	1300.00	103	5.62	140	2.50	22.5	50.0	90.0	240

Aggregate Nutrient Ecoregion: XIV
Rivers and Streams
Descriptive Statistics by Decade and Season
Parameter Turb_FTU_Median

SEASON	N	MEAN	MIN	MAX	STDDEV	STDERR	CV	P5	P25	MEDIAN	P75	P95
FALL	236	6.67	.800	41.80	6.21	0.40	93	1.10	2.89	4.80	8.31	18.2
SPRING	248	8.53	.700	107.00	10.1	0.64	118	1.20	3.20	6.10	10.0	23.0
SUMMER	221	9.41	.500	104.00	10.3	0.70	110	1.35	3.50	6.50	12.0	24.5
WINTER	218	7.33	.600	49.00	7.21	0.49	98	1.10	2.78	4.90	9.30	23.0

Aggregate Nutrient Ecoregion: XIV
Rivers and Streams
Descriptive Statistics by Decade and Season
Parameter Turb_JCU_Median

SEASON	N	MEAN	MIN	MAX	STDDEV	STDERR	CV	P5	P25	MEDIAN	P75	P95
FALL	12	9.07	1.35	30.00	8.95	2.58	99	1.35	2.10	5.63	11.9	30.0
SPRING	13	11.1	2.20	49.00	13.4	3.71	120	2.20	3.40	4.30	18.3	49.0
SUMMER	11	11.4	2.78	33.00	9.38	2.83	82	2.78	5.90	7.00	16.0	33.0
WINTER	11	12.6	1.93	34.00	11.4	3.43	90	1.93	4.35	7.40	20.0	34.0

Aggregate Nutrient Ecoregion: XIV
Rivers and Streams
Descriptive Statistics by Decade and Season
Parameter Turb_NTU_Median

SEASON	N	MEAN	MIN	MAX	STDDEV	STDERR	CV	P5	P25	MEDIAN	P75	P95
FALL	22	5.39	1.00	17.70	4.26	0.91	79	1.75	2.40	4.20	5.90	14.0
SPRING	19	5.54	.675	16.95	4.10	0.94	74	0.68	2.05	4.60	6.80	17.0
SUMMER	39	4.68	.250	24.55	4.86	0.78	104	0.25	1.80	3.00	5.60	14.5
WINTER	16	6.57	1.20	28.00	6.71	1.68	102	1.20	1.83	5.35	7.45	28.0

APPENDIX B

Descriptive Statistics Data Tables for Level III Subecoregions within Aggregate Ecoregion

Aggregate Nutrient Ecoregion: XIV
Rivers and Streams
Descriptive Statistics by Decade and Season
Parameter Chla_Fluor_ug_L_Median

Eco_ Level_ III	SEASON	N	MEAN	MIN	MAX	STDDEV	STDERR	CV	P5	P25	MEDIAN	P75	P95
59	FALL	0	.	.	.	.	.	.	.	.	.	.	.
59	SPRING	0	.	.	.	.	.	.	.	.	.	.	.
59	SUMMER	0	.	.	.	.	.	.	.	.	.	.	.
59	WINTER	0	.	.	.	.	.	.	.	.	.	.	.
63	FALL	17	5.24	.250	55.00	13.7	3.32	261	0.25	0.25	0.63	2.00	55.0
63	SPRING	19	1.92	.250	5.00	1.38	0.32	72	0.25	0.63	1.90	3.00	5.00
63	SUMMER	22	4.62	.250	23.50	4.79	1.02	104	0.25	2.00	4.00	6.00	8.00
63	WINTER	16	2.14	.250	19.13	4.66	1.17	218	0.25	0.25	0.63	1.63	19.1
84	FALL	0	.	.	.	.	.	.	.	.	.	.	.
84	SPRING	0	.	.	.	.	.	.	.	.	.	.	.
84	SUMMER	0	.	.	.	.	.	.	.	.	.	.	.
84	WINTER	0	.	.	.	.	.	.	.	.	.	.	.

Aggregate Nutrient Ecoregion: XIV
Rivers and Streams
Descriptive Statistics by Decade and Season
Parameter Chla_Phyto_Spec_A_ug_L_Median

Eco_ Level_ III	SEASON	N	MEAN	MIN	MAX	STDDEV	STDERR	CV	P5	P25	MEDIAN	P75	P95
59	FALL	0	.	.	.	.	.	.	.	.	.	.	.
59	SPRING	0	.	.	.	.	.	.	.	.	.	.	.
59	SUMMER	0	.	.	.	.	.	.	.	.	.	.	.
59	WINTER	0	.	.	.	.	.	.	.	.	.	.	.
63	FALL	43	18.4	.000	103.33	25.6	3.91	139	0.25	4.50	9.47	19.0	82.5
63	SPRING	48	15.7	.000	99.00	24.2	3.50	155	0.25	3.00	6.62	11.8	80.0
63	SUMMER	50	28.5	.000	151.19	27.3	3.86	96	0.25	10.3	21.3	40.0	74.5
63	WINTER	39	16.6	.250	147.00	35.8	5.74	216	0.25	2.63	4.24	8.07	139
84	FALL	3	10.2	2.66	15.31	6.64	3.83	65	2.66	2.66	12.5	15.3	15.3
84	SPRING	0	.	.	.	.	.	.	.	.	.	.	.
84	SUMMER	3	11.2	3.51	17.85	7.23	4.18	64	3.51	3.51	12.3	17.9	17.9
84	WINTER	0	.	.	.	.	.	.	.	.	.	.	.

Aggregate Nutrient Ecoregion: XIV
Rivers and Streams
Descriptive Statistics by Decade and Season
Parameter Chla_Phyto_Spec_U_ug_L_Median

Eco_ Level_ III	SEASON	N	MEAN	MIN	MAX	STDDEV	STDERR	CV	P5	P25	MEDIAN	P75	P95
59	FALL	0	.	.	.	.	.	.	.	.	.	.	.
59	SPRING	0	.	.	.	.	.	.	.	.	.	.	.
59	SUMMER	3	12.4	2.80	27.20	13.0	7.51	105	2.80	2.80	7.20	27.2	27.2
59	WINTER	0	.	.	.	.	.	.	.	.	.	.	.

63	FALL	0	.	.	.	.	.	.	.	.	.	.	.
63	SPRING	0	.	.	.	.	.	.	.	.	.	.	.
63	SUMMER	0	.	.	.	.	.	.	.	.	.	.	.
63	WINTER	0	.	.	.	.	.	.	.	.	.	.	.
84	FALL	0	.	.	.	.	.	.	.	.	.	.	.
84	SPRING	0	.	.	.	.	.	.	.	.	.	.	.
84	SUMMER	0	.	.	.	.	.	.	.	.	.	.	.
84	WINTER	0	.	.	.	.	.	.	.	.	.	.	.

Aggregate Nutrient Ecoregion: XIV
Rivers and Streams
Descriptive Statistics by Decade and Season
Parameter Chla_Tric_U_ug_L_Median

Eco_ Level_ III	SEASON	N	MEAN	MIN	MAX	STDDEV	STDERR	CV	P5	P25	MEDIAN	P75	P95
59	FALL	0	.	.	.	.	.	.	.	.	.	.	.
59	SPRING	0	.	.	.	.	.	.	.	.	.	.	.
59	SUMMER	0	.	.	.	.	.	.	.	.	.	.	.
59	WINTER	0	.	.	.	.	.	.	.	.	.	.	.
63	FALL	14	33.1	1.59	115.62	37.2	9.95	112	1.59	3.31	12.7	45.3	116
63	SPRING	15	22.8	.290	125.37	37.2	9.60	163	0.29	3.85	11.0	18.4	125
63	SUMMER	15	29.5	1.70	117.39	32.3	8.35	110	1.70	6.13	16.5	51.0	117
63	WINTER	13	15.3	1.40	78.27	24.0	6.66	157	1.40	2.85	6.47	8.55	78.3
84	FALL	0	.	.	.	.	.	.	.	.	.	.	.
84	SPRING	0	.	.	.	.	.	.	.	.	.	.	.
84	SUMMER	0	.	.	.	.	.	.	.	.	.	.	.
84	WINTER	0	.	.	.	.	.	.	.	.	.	.	.

Aggregate Nutrient Ecoregion: XIV
Rivers and Streams
Descriptive Statistics by Decade and Season
Parameter DIP_ug_L_Median

Eco_ Level_ III	SEASON	N	MEAN	MIN	MAX	STDDEV	STDERR	CV	P5	P25	MEDIAN	P75	P95
59	FALL	19	2051	5.00	22000.0	5885	1350	287	5.00	17.5	30.0	200	22E3
59	SPRING	19	1414	5.00	14000.0	4138	949	293	5.00	10.0	12.5	52.5	14E3
59	SUMMER	19	2599	5.00	30000.0	7772	1783	299	5.00	20.0	30.0	128	3E4
59	WINTER	19	956	5.00	9250.00	2712	622	284	5.00	15.0	20.0	65.0	9250
63	FALL	8	45.8	20.0	112.50	38.6	13.6	84	20.0	20.3	28.8	67.8	113
63	SPRING	7	37.1	7.50	75.00	25.6	9.67	69	7.50	12.5	32.5	67.5	75.0
63	SUMMER	8	60.3	12.5	197.50	62.1	21.9	103	12.5	25.8	37.8	72.5	198
63	WINTER	7	25.7	5.00	70.00	22.3	8.41	87	5.00	5.00	20.0	35.0	70.0
84	FALL	9	10.0	.000	50.00	15.3	5.09	152	0.00	5.00	5.00	5.00	50.0
84	SPRING	9	6.61	.000	22.25	7.05	2.35	107	0.00	3.75	5.00	5.00	22.3
84	SUMMER	9	12.9	.000	45.00	17.2	5.73	133	0.00	5.00	5.00	6.25	45.0
84	WINTER	9	8.94	.000	25.50	8.83	2.94	99	0.00	5.00	6.25	6.25	25.5

Aggregate Nutrient Ecoregion: XIV
Rivers and Streams
Descriptive Statistics by Decade and Season
Parameter DO_mg_L_Median

Eco_ Level_ III	SEASON	N	MEAN	MIN	MAX	STDDEV	STDERR	CV	P5	P25	MEDIAN	P75	P95
59	FALL	0	.	.	.	.	.	.	.	.	.	.	.
59	SPRING	0	.	.	.	.	.	.	.	.	.	.	.
59	SUMMER	0	.	.	.	.	.	.	.	.	.	.	.
59	WINTER	0	.	.	.	.	.	.	.	.	.	.	.
63	FALL	0	.	.	.	.	.	.	.	.	.	.	.
63	SPRING	0	.	.	.	.	.	.	.	.	.	.	.
63	SUMMER	0	.	.	.	.	.	.	.	.	.	.	.
63	WINTER	0	.	.	.	.	.	.	.	.	.	.	.
84	FALL	1	10.3	10.3	10.25	.	.	.	10.3	10.3	10.3	10.3	10.3
84	SPRING	1	10.0	10.0	10.00	.	.	.	10.0	10.0	10.0	10.0	10.0
84	SUMMER	1	8.50	8.50	8.50	.	.	.	8.50	8.50	8.50	8.50	8.50
84	WINTER	1	11.5	11.5	11.50	.	.	.	11.5	11.5	11.5	11.5	11.5

Aggregate Nutrient Ecoregion: XIV
Rivers and Streams
Descriptive Statistics by Decade and Season
Parameter NO2_NO3_mg_L_Median

Eco_ Level_ III	SEASON	N	MEAN	MIN	MAX	STDDEV	STDERR	CV	P5	P25	MEDIAN	P75	P95
59	FALL	38	0.80	.065	4.90	1.08	0.17	134	0.09	0.23	0.37	0.87	3.80
59	SPRING	38	0.59	.100	3.27	0.67	0.11	113	0.11	0.28	0.34	0.59	2.50
59	SUMMER	41	0.99	.103	5.10	1.31	0.21	132	0.11	0.34	0.43	1.25	4.77
59	WINTER	38	0.70	.153	3.35	0.70	0.11	100	0.17	0.34	0.49	0.71	2.89
63	FALL	187	0.55	.000	6.90	1.08	0.08	197	0.01	0.02	0.09	0.46	2.56
63	SPRING	190	0.61	.003	7.99	1.13	0.08	187	0.01	0.04	0.13	0.58	2.80
63	SUMMER	190	0.40	.000	6.93	0.77	0.06	192	0.01	0.03	0.11	0.39	1.94
63	WINTER	162	0.73	.003	8.90	1.26	0.10	173	0.01	0.04	0.17	0.86	3.26
84	FALL	70	1.15	.010	5.88	1.24	0.15	108	0.02	0.20	0.78	1.65	3.50
84	SPRING	76	1.11	.010	4.40	1.10	0.13	99	0.03	0.20	0.84	1.61	3.30
84	SUMMER	61	1.13	.010	4.19	1.07	0.14	95	0.02	0.29	0.77	1.57	3.57
84	WINTER	74	1.32	.018	5.78	1.25	0.15	95	0.03	0.29	0.92	2.14	3.60

Aggregate Nutrient Ecoregion: XIV
Rivers and Streams
Descriptive Statistics by Decade and Season
Parameter Orthophosphate_T_as_P_ug_L_Med

Eco_ Level_ III	SEASON	N	MEAN	MIN	MAX	STDDEV	STDERR	CV	P5	P25	MEDIAN	P75	P95
59	FALL	11	42.5	5.00	290.00	82.5	24.9	194	5.00	7.50	20.0	30.0	290
59	SPRING	11	21.4	5.00	90.00	23.5	7.07	110	5.00	10.0	15.0	20.0	90.0
59	SUMMER	11	43.6	5.00	280.00	79.1	23.8	181	5.00	10.0	25.0	27.5	280

59	WINTER	11	27.3	5.00	140.00	37.9	11.4	139	5.00	12.5	20.0	20.0	140
63	FALL	5	48.0	25.0	75.00	23.1	10.3	48	25.0	30.0	40.0	70.0	75.0
63	SPRING	5	46.8	30.0	72.50	16.1	7.20	34	30.0	38.8	42.5	50.0	72.5
63	SUMMER	5	72.0	35.0	155.00	49.6	22.2	69	35.0	40.0	50.0	80.0	155
63	WINTER	5	43.0	25.0	80.00	25.6	11.5	60	25.0	25.0	25.0	60.0	80.0
84	FALL	8	15.2	5.00	50.00	17.2	6.10	114	5.00	5.00	5.00	23.1	50.0
84	SPRING	8	13.2	5.00	35.00	9.12	3.22	69	5.00	9.38	11.3	12.3	35.0
84	SUMMER	8	18.1	5.00	55.00	19.8	6.98	109	5.00	5.50	8.75	28.3	55.0
84	WINTER	8	14.5	5.00	30.00	9.45	3.34	65	5.00	6.25	11.9	22.5	30.0

Aggregate Nutrient Ecoregion: XIV
Rivers and Streams
Descriptive Statistics by Decade and Season
Parameter TKN_mg_L_Median

Eco_ Level_ III	SEASON	N	MEAN	MIN	MAX	STDDEV	STDERR	CV	P5	P25	MEDIAN	P75	P95
59	FALL	76	0.49	.050	1.50	0.30	0.03	62	0.05	0.30	0.40	0.61	1.00
59	SPRING	55	0.44	.050	1.23	0.29	0.04	65	0.05	0.30	0.35	0.57	1.10
59	SUMMER	71	0.51	.050	2.10	0.32	0.04	63	0.05	0.30	0.45	0.69	1.00
59	WINTER	55	0.45	.050	1.40	0.32	0.04	72	0.10	0.23	0.35	0.51	1.15
63	FALL	203	0.74	.050	2.40	0.38	0.03	52	0.30	0.50	0.68	0.91	1.47
63	SPRING	201	0.83	.140	3.91	0.52	0.04	63	0.34	0.52	0.70	1.00	1.63
63	SUMMER	207	0.93	.050	3.80	0.50	0.03	54	0.42	0.60	0.80	1.10	2.11
63	WINTER	195	0.67	.200	2.36	0.35	0.02	52	0.30	0.45	0.60	0.76	1.45
84	FALL	81	0.42	.050	1.99	0.32	0.04	75	0.10	0.23	0.31	0.51	0.96
84	SPRING	82	0.41	.010	1.90	0.29	0.03	70	0.10	0.25	0.35	0.49	1.03
84	SUMMER	62	0.60	.050	4.15	0.54	0.07	91	0.24	0.35	0.49	0.65	1.04
84	WINTER	79	0.43	.050	2.53	0.39	0.04	90	0.05	0.19	0.33	0.55	1.33

Aggregate Nutrient Ecoregion: XIV
Rivers and Streams
Descriptive Statistics by Decade and Season
Parameter TN_mg_L_Median

Eco_ Level_ III	SEASON	N	MEAN	MIN	MAX	STDDEV	STDERR	CV	P5	P25	MEDIAN	P75	P95
59	FALL	11	0.88	.400	2.30	0.52	0.16	59	0.40	0.58	0.73	0.94	2.30
59	SPRING	11	0.77	.405	1.95	0.42	0.13	54	0.41	0.56	0.65	0.78	1.95
59	SUMMER	14	0.85	.296	2.90	0.65	0.17	76	0.30	0.44	0.74	0.94	2.90
59	WINTER	11	0.85	.473	1.78	0.38	0.11	45	0.47	0.59	0.73	0.98	1.78
63	FALL	31	1.44	.345	3.29	0.70	0.13	48	0.48	0.82	1.40	1.84	2.92
63	SPRING	21	1.47	.610	3.88	0.91	0.20	62	0.70	1.06	1.15	1.39	3.50
63	SUMMER	31	1.67	.460	4.29	0.95	0.17	57	0.62	0.92	1.53	1.86	3.76
63	WINTER	20	1.60	.535	4.33	1.02	0.23	64	0.57	0.82	1.36	1.77	4.00
84	FALL	11	1.22	.200	2.20	0.73	0.22	60	0.20	0.34	1.20	1.95	2.20
84	SPRING	8	1.11	.200	2.15	0.70	0.25	63	0.20	0.47	1.17	1.63	2.15
84	SUMMER	11	1.05	.270	1.73	0.46	0.14	44	0.27	0.53	1.30	1.36	1.73
84	WINTER	8	1.33	.300	3.10	1.00	0.35	75	0.30	0.50	1.10	2.04	3.10

Aggregate Nutrient Ecoregion: XIV
Rivers and Streams
Descriptive Statistics by Decade and Season
Parameter TP_ug_L_Median

Eco_ Level_ III	SEASON	N	MEAN	MIN	MAX	STDDEV	STDERR	CV	P5	P25	MEDIAN	P75	P95
59	FALL	76	136	2.50	1430.00	256	29.3	188	2.50	28.8	50.0	90.0	580
59	SPRING	55	67.7	2.50	385.00	81.2	10.9	120	2.50	20.0	37.5	80.0	250
59	SUMMER	87	131	2.50	1760.00	250	26.8	191	10.0	25.0	50.0	90.0	650
59	WINTER	55	76.7	2.50	382.50	95.1	12.8	124	2.50	22.5	35.0	67.5	318
63	FALL	221	113	.000	1450.00	135	9.11	120	16.3	50.0	77.5	128	300
63	SPRING	218	108	5.00	1600.00	127	8.57	117	30.0	55.0	80.0	113	280
63	SUMMER	223	161	5.00	2300.00	251	16.8	156	35.0	70.0	100	160	400
63	WINTER	200	88.2	.000	1300.00	117	8.28	133	11.3	36.3	60.0	100	240
84	FALL	83	36.4	2.50	230.00	47.7	5.24	131	2.50	5.00	20.0	42.5	145
84	SPRING	81	41.6	2.50	312.50	55.7	6.19	134	2.50	6.88	15.0	57.5	145
84	SUMMER	65	62.8	2.50	470.00	83.1	10.3	132	2.50	13.1	30.0	80.0	230
84	WINTER	79	34.3	2.50	240.00	42.4	4.77	124	2.50	6.88	16.3	50.0	125

Aggregate Nutrient Ecoregion: XIV
Rivers and Streams
Descriptive Statistics by Decade and Season
Parameter Turb_FTU_Median

Eco_ Level_ III	SEASON	N	MEAN	MIN	MAX	STDDEV	STDERR	CV	P5	P25	MEDIAN	P75	P95
59	FALL	33	1.91	.800	6.58	1.16	0.20	60	0.80	1.28	1.55	2.05	4.50
59	SPRING	34	2.96	.700	31.00	5.11	0.88	173	0.70	1.25	1.63	3.10	5.33
59	SUMMER	33	2.07	.900	5.68	0.97	0.17	47	1.00	1.40	1.80	2.45	3.35
59	WINTER	32	2.09	.600	5.08	1.19	0.21	57	0.93	1.23	1.68	2.79	4.58
63	FALL	168	7.98	1.00	41.80	6.21	0.48	78	2.35	4.00	5.95	10.2	19.3
63	SPRING	179	10.3	1.00	107.00	11.0	0.82	107	2.25	5.00	7.90	11.9	29.3
63	SUMMER	169	11.0	1.25	104.00	10.7	0.82	97	2.53	5.30	8.50	13.5	24.6
63	WINTER	152	8.94	1.85	49.00	7.51	0.61	84	2.30	4.00	7.05	11.0	25.0
84	FALL	35	4.86	.900	36.00	6.47	1.09	133	1.00	1.40	3.00	5.35	18.9
84	SPRING	35	5.13	.925	25.00	5.00	0.85	97	1.03	2.15	3.20	6.90	15.6
84	SUMMER	19	8.19	.500	39.00	10.8	2.47	132	0.50	1.40	2.30	14.4	39.0
84	WINTER	34	5.08	.600	26.40	6.18	1.06	122	0.70	2.25	2.95	5.40	23.0

Aggregate Nutrient Ecoregion: XIV
Rivers and Streams
Descriptive Statistics by Decade and Season
Parameter Turb_JCU_Median

Eco_ Level_ III	SEASON	N	MEAN	MIN	MAX	STDDEV	STDERR	CV	P5	P25	MEDIAN	P75	P95
59	FALL	0	.	.	.	.	.	.	.	.	.	.	.
59	SPRING	0	.	.	.	.	.	.	.	.	.	.	.
59	SUMMER	0	.	.	.	.	.	.	.	.	.	.	.

59	WINTER	0	.	.	.	.	.	.	.	.	.	.	.
63	FALL	11	9.75	1.35	30.00	9.06	2.73	93	1.35	2.20	5.65	12.8	30.0
63	SPRING	11	12.5	2.20	49.00	14.2	4.28	114	2.20	3.40	4.35	20.0	49.0
63	SUMMER	9	12.3	4.83	33.00	9.99	3.33	81	4.83	6.05	7.00	16.0	33.0
63	WINTER	9	14.3	1.93	34.00	12.0	4.00	84	1.93	6.80	8.80	20.0	34.0
84	FALL	1	1.60	1.60	1.60	.	.	.	1.60	1.60	1.60	1.60	1.60
84	SPRING	2	3.71	3.23	4.20	0.69	0.49	19	3.23	3.23	3.71	4.20	4.20
84	SUMMER	2	7.39	2.78	12.00	6.52	4.61	88	2.78	2.78	7.39	12.0	12.0
84	WINTER	2	5.09	4.35	5.83	1.04	0.74	21	4.35	4.35	5.09	5.83	5.83

Aggregate Nutrient Ecoregion: XIV
Rivers and Streams
Descriptive Statistics by Decade and Season
Parameter Turb_NTU_Median

Eco_ Level_ III	SEASON	N	MEAN	MIN	MAX	STDDEV	STDERR	CV	P5	P25	MEDIAN	P75	P95
59	FALL	6	2.18	1.00	3.25	0.85	0.35	39	1.00	1.75	2.03	3.05	3.25
59	SPRING	3	1.29	.675	1.80	0.57	0.33	44	0.68	0.68	1.40	1.80	1.80
59	SUMMER	23	2.26	.250	5.60	1.22	0.25	54	0.25	1.60	2.00	2.85	4.05
59	WINTER	2	1.83	1.75	1.90	0.11	0.08	6	1.75	1.75	1.83	1.90	1.90
63	FALL	16	6.60	2.40	17.70	4.42	1.10	67	2.40	3.90	5.05	7.81	17.7
63	SPRING	16	6.33	2.05	16.95	3.98	1.00	63	2.05	3.63	5.78	8.13	17.0
63	SUMMER	16	8.15	2.00	24.55	5.99	1.50	73	2.00	3.88	6.00	12.1	24.6
63	WINTER	14	7.25	1.20	28.00	6.93	1.85	96	1.20	3.90	5.75	8.40	28.0
84	FALL	0	.	.	.	.	.	.	.	.	.	.	.
84	SPRING	0	.	.	.	.	.	.	.	.	.	.	.
84	SUMMER	0	.	.	.	.	.	.	.	.	.	.	.
84	WINTER	0	.	.	.	.	.	.	.	.	.	.	.

APPENDIX C

Quality Control/Quality Assurance Rules