Nebraska Stream Classification Using Fish, Macroinvertebrates, Habitat, And, Chemistry Evaluations From R-EMAP Data, 1997-2001.

Project Report

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Many taxonomic lists, CDF graphics, box plots, and other statistical results were not included in this report because of the massive size of the data. To receive a copy to these results or a copy of the report, contact:

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1. Introduction

The EMAP (Environmental Monitoring and Assessment Program) was initiated by U.S. Environmental Protection Agency (EPA) to estimate the current status and trends of the nation's ecological resources and examine associations between ecological condition and natural and anthropogenic influences. The surface water component of EMAP is based on the premise that the condition of stream biota can be addressed by examining biological and ecological indicators of stress. The long-term goal of EMAP is to develop ecological methods and procedures that permit the measurement of environmental resources to determine if they are in an acceptable or unacceptable condition relative to a set of environmental or ecological values (Herger and Hayslip, 2000). The data collected would give insight into whether or not ecological resources are responding positively, negatively or not at all to existing or future regulatory programs (Lazorchak et al., 1998).

In 1994, the EPA initiated the Regional Environmental Monitoring and Assessment Program (R-EMAP) in EPA Region VII. The purpose of this study was to determine initial health and quality of the fisheries in Region VII and establish baseline data to be used in evaluating trends throughout the region (Peters et al., 2002). The Nebraska Department of Environmental Quality (NDEQ) conducted the survey from 1997 through 2001. The objectives of the survey were a) to collect data to measure the status of biological integrity and riparian habitat quality of the state's stream resources, b) to determine whether differences exist between fish and macroinvertebrate communities and in-stream and near-stream habitats from the different ecoregions of Nebraska, and c) to determine and develop the Index of Biological Integrity Index (IBI) for fish, an Invertebrate Community Index (ICI) for macroinvertebrate communities, and a Nebraska Habitat Index (NHI) for the stream environs within the Nebraska Ecoregions.

2. General description of Nebraska and Ecoregions

Nebraska is considered to be a transition zone between the eastern and western, and northern and southern species of biota of North America (Weaver 1965). Using soil and topographic characteristics, the state can roughly be divided into five major physiographic regions: Low Plains, Northern Plains, Sandhills, High Plains and Pine Ridge.

The Low Plains and Northern Plains ecoregions are largely composed of plains and rolling hills of loess dissected by streams that lead to the Missouri River. This physiographic region includes the Nemaha, Big Blue, Little Blue, Republican, Lower Elkhorn, Middle and Lower Platte, Lower Loup, Lower Niobrara, and Missouri Tributary River Basins. Land use is primarily agricultural. Streams within this region typically have a silt-sand substrate and often carry a heavy sediment load. The major exception to this is in the southeast corner of the state where Kansas Flinthill outcroppings are common. The native vegetation along the streams was typically tall grass prairie (bluestem, switch grass, and Indian grass) and western-most extensions of eastern deciduous forests (oak) along major streams.

The Sandhills ecoregion streams have substrates that consist of sand and sand-silt mixtures. The Middle Niobrara, Upper Loup, and Upper Elkhorn River Basins make up the drainage areas in this region. Mixed grass prairie (canary and cord grass) and a few trees (cottonwoods and willows) make up the vegetation along the banks. Land use is cropland-pasture in the eastern half and primarily rangeland in the western half. The water is typically very clean due to predominately groundwater sources. Most stream substrates, which consist of shifting sand, and high current velocities, have reduced midstream habitat. Because of this, the majority of fish and macroinvertebrates are found along the stream edges and in "backwater" areas. The western portion of this region consists of numerous lakes that are very stable due to the high ground water levels. Very little macroinvertebrate and fish fauna research prior to 1980 has been conducted in the Sandhills.

The High Plains and Pine Ridge regions consists of the Upper Niobrara, North Platte, South Platte, Upper Republican, White, and Hat Creek River Basins. Land use is primarily cropland and irrigated agriculture in the river valleys and rangeland above the valleys with low to high hills. Vegetation along the stream banks was generally grass (blue gramma and buffalo) with a few trees (cottonwood and willow). The water is typically clean and fast flowing with substrates of sand-gravel-silt mixtures. Some taxa collected in these ecoregions are commonly found in montain regions in Colorado and Wyoming.

Omernik (1987), and Omernik and Gallant (1987) compiled maps of ecoregions of the United States. These maps were compiled by noting regional similarities using a combination of terrestrial and stream characteristics (Whittier et al. 1988). More recently, Omernik revised and refined the ecoregions of Nebraska and Kansas into several subecoregions (Chapman et al. 2001)(Figure 1). Based on these studies, Nebraska falls into six Level III Ecoregions and 29 Level IV Ecoregions. Level III Ecoregions include the Western High Plains (Ecoregion 25), Central Great Plains (27), Northwestern Glaciated Plains (42), Northwestern Great Plains (43), Nebraska Sandhills (44), and Western Corn Best Plains (47).

3. Methods

Sampling protocols used during the Nebraska REMAP study were those established by the EPA for the REMAP project (USEPA, 1994; Kaufman et al., 1999). These protocols were developed for use in wadeable streams. Survey crews consisted of 5 to 7 persons, depending on the size of the streams.

3.1 Site selection

Site locations were generated randomly by computer from digitized maps of perennial streams using Generalized Random Tessellation Stratified Design. The sampling design was derived from the approach used in EMAP (Messer et al., 1991, Overton et al., 1990, Stevens et al., 1992). Categories within the design were defined by Strahler orders (1st, 2^{nd}, 3^{rd}, 4^{th}+) and river basins. There were approximately 120 sites selected per basin and they were selected in equal numbers by Strahler order and river basin. River basins were defined by HUC-based boundaries. From this random listing, 35 sites were chosen per year for sampling depending on presence of water, wadeability, and landowner permission. Two to three basins were sampled per year. In addition to these random sites, five selected sites were used as proposed reference sites per year. The proposed reference sites were designated as ecoregion reference sites to represent the best attainable habitat, water quality, and biological characteristics of an ecoregion (Peter et al., 2002). During each year, four sites were revisited in the late summer for representativeness purposes. Figures 2 and 3 shows the distribution of the perennial and reference sampling locations across the state. Table 1 lists the steams, counties, stream size, flow, substrate, and latitude and longitude of the stream sites.

3.2 Water, sediment, and fish tissue chemistries

Water quality measurements and samples were collected prior to disturbance of the area by the sampling team. Water quality parameters measured at the site included, temperature, pH, dissolved oxygen, turbidity and conductivity. The EPA Region VII Laboratory in Kansas City analyzed all chemical samples, Kansas for heavy metals, nitrogen, and pesticides using approved EPA methods. Discharge was calculated from measurements of depth and velocity with a wading rod and Marsh-McBirney flow meter at the best possible transect within the study reach.

Fine sediment samples were collected in the areas of sediment deposition along the stream edge, from pool areas, or on the leeward sided of objects in the streams channel. The samples were collected in a

glass container with a Teflon lined lid and sent to the EPA Region VII Laboratory for further chemical analysis. Sediment chemical analysis was conducted for heavy metals and pesticides using approved EPA methods.

Fish tissue samples were collected from bottom feeding fish or game species of fish. Tissue samples consisted of three to five uniformly sized individuals of the same species and having a combined mass of at least 500 grams (or one pound). Fish species collected were: Channel Catfish, White Sucker, Common Carp, Largemouth Bass, or a Trout species. All fish samples were wrapped in foil and stored on ice in plastic bags until they could be frozen in the laboratory. Fish tissue analysis was done in the EPA Region VII Laboratory. Sample analysis included the entire whole fish, which were rinsed and then homogenized in a stainless steel blender. A subsample of the fish tissue was then analyzed for heavy metals and pesticides using approved EPA methods.

3.3 Physical and habitat measurements

The average width of the stream was determined and was used to determine the total length of the study reach using the equation 40 times the average width. The length of the stream sampled ranged from 150 to 300 m. Physical habitat was measured in the sample reach at 11 evenly spaced cross-sectional transects and at 100 points along the thalweg following EPA EMAP protocol (Kaufmann and Robison 1998). At each transect, depth, substrate size class, and substrate embeddedness were measured at five equally spaced points between the wetted edges of the stream. At both sides of the stream, the angle of the stream bank relative to the water surface, distance from water surface to bankfull height, stream incision depth, bankfull width and amount of overhang by undercut bank were measured. Canopy cover was measured at the sides and centers of transects. The amounts of fish cover in nine categories (filamentous algae, macrophytes, woody debris, brush, overhanging vegetation, undercut banks, boulders, artificial structures) were visually estimated. Riparian vegetation cover was assessed by visually estimating the amount of canopy (> 5 m high), understory (0.5-5.0 m), and ground cover (<0.5 m) on both banks at transect locations. The presence or absence and proximity of human disturbance (row crops, grazing, building, road, etc.) was visually assessed at each transect. Thalweg measurements included depth, presence of fine substrate (< 16 mm diameter) habitat unit type (pool, riffle, run, dry channel), and presence of side channels and backwaters. A visual Rapid Habitat Assessment (Lazorchak et al. 1998) based on 12 habitat parameters (instream fish cover, epifaunal substrate, pool substrate characterization, pool variability, channel alteration, sediment deposition, channel flow status, bank condition, bank vegetative protection, grazing or disruptive pressure, riparian vegetated zone width) was also completed for each sampled reach. Water surface slope and azimuth were also measured.

3.4 Fish collections

Fish samples were collected at each sampling location. Sampling was dependent on stream size and condition. A backpack shocker was used for small and medium sized streams (flows less than 10 cfs, Table 2). Larger, deeper streams were electroshocked utilizing a portable generator transported in a small boat. Block nets were used downstream on smaller streams when fish collection was hampered by turbidity or other factors. Stunned fish were netted and placed in buckets containing ambient water for holding and recovery. The length of stream sampled was by calculated to be 40 times the width of the stream as determined above under physical and habitat measurements and ranged from 150 to 300 m. Seining was conducted with a 30 foot long ¼ inch mesh bag seine. The number of seining attempts was determined by the complexity and size of the stream. Both methods were used to cover the biases of the other sampling method has toward particular sizes and species of fish. Large fish were identified in the field and released unless they were to be used for fish tissue samples. Small fish were mainly identified in the field, however, small hard to identify specimens were preserved for identification in the laboratory. A subsample of these specimens were sent to Dr. Mark Eberle at the Sternberg Museum of Natural

History, Fort Hays University, Hays, Kansas for confirmation or identification. Total numbers were derived for all samples.

3.5 Macroinvertebrate collections

Aquatic macroinvertebrates were collected at each site using a number of sampling methods and were combined for assessment. The different sampling methods were done to account for the different types of communities and habitats found in each stream. Hester-Dendy Artificial Substrate Samplers consisted of 14 variable spaced round plates 3 inches in diameter and made of 1/8 inch tempered masonite. The spacer between each plate varied with 8 single spacers, 1 double spacer, 2 triple spacers and 2 quadruple spacers. The surface area was approximately 0.16 m^2. Overhanging vegetation samples were collected from the stream edge in the grasses bent into the water. The samples were collected by sweeping a D-net (500µm Nitex net, 18 inch wide base) in an upward vertical motion through the overhanging vegetation. The surface area sampled was approximately 1.67 m^2. If habitat was limited, fewer sweeps were made, but was noted on the field sheet. Pool substrate was sampled by dragging a D-net through the substrate in a pool area with a silt bottom for a length of one foot and one inch deep. The total sample consisted of 6 drags and had a surface area of 1.67 m^2. Riffles were sampled using a Surber Stream Bottom Sampler (12 inch X 12 inch opening). A riffle area was defined as an area of relatively shallow water with an accelerated velocity where the water surface is rough or broken. The riffle substrate consisted of gravel or larger stones. Six samples were taken from each riffle and were made by agitating the contents of the substrate to allow the contained and attached organisms to be washed downstream into the Surber net (500 µm Nitex). Surface area was 0.56 m^2. Qualitative samples were taken to include all other habitats not collected. Habitats included woody debris, log jams, larger rocks, submergent and emergent vegetation. An effort of 15 to 20 minutes for one person was made to sample these additional habitats.

In the field individual samples were placed in a No. 30 mesh sieve or wash bucket (595 µm openings) and washed to remove mud and small debris. Large debris was also removed by hand. Collections from each habitat were placed in plastic jars and preserved in 10 percent formalin. In the laboratory, samples were rinsed in water and represerved in 70% ethanol. The samples were sent to McBride Benthic Consulting or Normandeau Associates, Inc, for sorting and identification.

Identifications of all organisms were made to the lowest possible taxon using taxonomic keys and literature (Table 3). Organisms were enumerated per taxa for each sample. Subsampling was not required for most samples but was conducted when taxa numbers were high. This procedure was done by recovering a percent volume of the sample with use of a grid placed underneath the sorting pan. The unanalyzed portion of the subsample was quickly scanned for unusual or unexpected organisms. The remaining portion of the sample was represerved and retained. Final counts were extrapolated to account for 100 percent of the sample.

Several representatives of each taxa of macroinvertebrates were saved for a project reference collection. The specimens were placed in vials, preserved in 70% ethanol, labeled and saved for future reference and comparisons.

All macroinvertebrates were brought to the same taxonomic level for assessment purposes of the project. If an identification made to a lower than required level, the identification was changed to the next level. For example, if an invertebrate was identified to the species level and the other identifications were to the genus level as needed for analysis, the identification was changed to the genus level. However, the species level was recorded in STORET.

4. Metrics

The measurement of overall fish, macroinvertebrate, and habitat community condition present in this report were determined using the Index of Biotic Integrity (IBI), the Invertebrate Community Index (ICI), and Nebraska Habitat Index (NHI). The indices used for the fish, macroinvertebrates, and habitats are modifications of the Index of Biotic Integrity (IBI) as developed by Karr (1981) and modified by several Fausch et al. (1984), Karr et al. (1986), Ohio EPA (1987), Plafkin et al. (1989), Barber et al. (1999). The fish IBI metrics used in this study were developed by the EPA Research Laboratory in Corvallis, Oregon and were selected from a list of metrics to best show responsiveness to disturbance, either natural or anthropogenic. The ICI consists of four community metrics and were modifications of the invertebrate indices of the Ohio EPA (1987), Herger and Hayslip (2000), and Wilton (2004). The NHI consisted of ten metrics and were selected from a list of metrics to best portray an interaction of habitat and biotic ranges.

The metrics used to evaluate the fish, macroinvertebrates, and habitat are discussed below. This discussion is primarily taken from Plafkin et al. (1989) and Barbour et al. (1999). The examples used in the discussion refer to Nebraska's use of each metric. In general, relative abundances, rather than absolute abundances, were used for these metrics because the relative contribution of individuals to the total fauna or habitat is more informative then abundance data on populations without knowledge of the interaction among taxa and habitats. (Plafkin et al. 1989, Barbour et al 1995). The premise is that a healthy and stable assemblage will be relatively consistent in its proportional representation, though individual abundances may vary in magnitude.

4.1 Fish Index of Biotic Integrity Metrics (IBI)

Metric 1. Total Number of Native Species**.**

This metric is based on the observation that the number of indigenous fish species decreases with increased degradation (Karr 1981; Karr et al., 1986; Barbour 1999). Thus the number of fish species is expected to give an indication of environmental quality throughout the range from exceptional to poor. Hybrids and introduced species are not included.

Metric 2. Total Number of Native Families.

The number decreases with increased degradation. As in the total number of native species, the number of families gives an indication of the environmental quality and complexity of a stream.

Metric 3. Total Number of Sensitive Species.

This metric distinguishes high and moderate quality sites using species that are intolerant of various chemical and physical perturbations. Intolerant species are typically the first species to disappear following a disturbance. Only species that are highly intolerant to a variety of disturbances were included in this metric so that it will respond to diverse types pf perturbations. Fish collected in Nebraska and their tolerance values, habitat requirements, and trophic class are shown in Table 4. Table 5 lists the scientific and common names of the fish.

Metric 4. Proportion of Tolerant Species in the Sample.

This metric is the reverse of Metric 3. This metric distinguishes low from moderate quality waters. Tolerant species show increased distribution or abundance despite historical degradation of surface water, and exhibit a shift from low densities to dominance in disturbed sites. Tolerant species are listed in Table 4.

Metric 5. Total Number of Benthic Species.

Benthic fish species are sensitive to degradation of steam benthic habitat because they have specific requirements for reproducing and feeding on the stream bottom (Roth et al, 2000). Benthic habitats can be degraded by channelization, siltation, or the reduction of dissolved oxygen and are often degraded in streams with watersheds that contain large amounts of impervious surface. Berkman and Rabeni (1987) documented reduced abundance of benthic insectivores in streams with increased amounts of silt in riffles. Darter and madtoms species were included as benthic specialist in this metric.

Metric 6. Total Number of Long-Lived Species.

This metric shows the effect of the water on fish species that live longer than one year. These species often represent popular sport fish such as bass, pike, walleye, and trout.

Metric 7. Proportion of Alien Species in the Sample.

This metric distinguishes low from moderate quality waters. These species show increased distribution or abundance despite the historical degradation of surface waters, and they shift from incidental to dominant in disturbed sites.

Metric 8. Proportion of Sample Carnivore Species

The top carnivore metric discriminates between systems with high and moderate integrity. Top carnivores are species that feed, as adults, predominantly on fish, other vertebrates, or crayfish. These species often represent popular sport fish such as bass, northern pike, walleye, and trout.

4.1.1 IBI Scoring Methods.

The data sets were divided into two groups for calibration of the metrics because of the inherent difference in species and habit types between ecoregion 47 (Western Cornbelt Plains) and the rest of the state. The raw metric values for each grouping were standardized to a scale of 0-10 by dividing the raw metric by the maximum possible metric scores and multiplying by 10. Total IBI scores were calculated by summing metric scores.

4.2 Invertebrate Community Index Metrics (ICI)

Metric 1. Total Number of Invertebrate Taxa.

The total number of taxa reflects the health of the community through a measurement of the variety of taxa (i.e., total number of genera or species) present. In similar habitats, the number of taxa generally increases with increasing water quality, habitat diversity, and habitat suitability. However, the number of taxa found in streams of the Sandhill ecoregion of the state was similar to the reduced number usually found in pristine headwater streams. Pristine waters are naturally unproductive and support only a limited number of taxa (Hynes 1970). In these situations, organic enrichment results in the increased number of taxa.

Metric 2. EPT Taxa Richness.

The EPT Taxa Index generally increases with increasing water quality. The EPT Index is the total number of distinct taxa within the insect orders Ephemeroptera, Plecoptera, and Trichoptera. This value summarizes taxa richness within the three insect orders that are generally considered to be pollution sensitive. Many EPT taxa are sensitive to toxic contaminants such as ammonia, metals, and insecticides. Their absence or rare occurrence is strong evidence of a water quality problem.

Metric 3. Modified Hilsenhoff Biotic Index.

Tolerance values assigned to each taxa range from 0 to 10, increasing was water quality decreases. The index was developed by Chutter (1972) and Hilsenhoff (1977. 1982, 1987, and 1988) to summarize overall pollution tolerance of the benthic arthropod community with a single value. This index was developed as a means of detecting organic pollution in communities inhabiting rock or gavel riffles. A few tolerance values were modified for the fauna found in Nebraska. Table 2 shows the tolerance values assigned to the macroinvertebrates found in the state. The tolerance values also include non-arthropod species and the tolerance values are similar to those used by the numerous Midwestern and other regions in the United States (Barbour et al. 1999).

The formula for calculating the Biotic Index is:

$$HBI = \sum \frac{(x_i)(t_i)}{n}$$

where x_i = number of individuals of each species
t_i = tolerance value of a species
n = total number of organisms in the sample

Metric 4. Percent Contribution of Dominant Taxon.

The percent contribution of the numerically dominant taxon to the total number of organisms is an indication of community balance. A community dominated by relatively few species indicates environmental stress. Healthy streams have diverse benthic macroinvertebrate assemblages in which the

majority is composed of numerous taxa. As stream conditions degrade, an increasingly higher portion of the assemblage is comprised of just a few opportunistic taxa.

4.2.1 ICI Scoring Methods.

The data sets were scored individually by ecoregion. For each ecoregion, reference sites were used as the basis for calibration and the metrics were give scores of one, three, five, or seven. A score of one was given to raw data score that were 12 percent or lower of the reference site distributions, a score of three as assigned to raw data scores between 13 and 25 percent, a score of five was given to raw data scores between 26 to 50 percent of the reference distributions, and seven was assigned as the score to raw data score greater than 50 percent of the reference distribution. For ecoregions with less than five reference sites (ecoregions 42,43, and 271) the nearest, most similar ecoregion was used for assigning the scoring Total IBI scores were calculated within a range of 0-100 by summing metric scores, dividing by the maximum possible score.

4.3 Nebraska Habitat Index Metrics (NHI).

The metric descriptions are taken mainly from Kaufman and Robison 1998 and Barbour et al. 1999.

Metric 1. Incision/Width Ratio.

This ratio is important in factoring the potential energy in a stream. This is also related to the degree to which the channel is filled with water. Water flows will change as the channel enlarges and aggrades streambeds with actively widening channels, thus influencing the discharge, flood stage, and stream power.

Metric 2. Percent Sand Substrate.

The percentage of sand in the substrate leads to the stability of the streambed. Wilcock (1998) shows that for a gravel-bed stream, a threshold of sand proportion greater than 20% to 40% initiates bed instability.

Metric 3. Percent Rowcrop.

The percentage of rowcrop adjacent to or near the stream will affect the sediment potential during heavy rains or spring thaws. A high sediment load will affect the habitat as well as the fauna of a stream.

Metric 4. Percent Riffle.

The extent and quality of the riffle is an important factor in the support of a healthy biological condition. Riffles and runs offer a diversity of habitat through a variety of particle size and will provide the most stable habitat.

Metric 5. Percent Undercut Banks.

The extent and quality of the undercut banks is another factor in the support of a healthy biological condition. The undercut banks serve as a refugia for fish in lower gradient streams.

Metric 6. Percent Overhanging Vegetation.

This goes along with the other metrics that offer a diversity of habitat types. The overhanging vegetation along the stream banks are among the most productive in sand bottom streams and provide a habitat structure for macroinvertebrates and fish refugia.

Metric 7. Percent Silt Substrate.

Good quality habitat is essential for stream habitat and stability. A pool or stream substrate dominated by mud and silt with no plants will not support as wide a variety of organisms as a firmer sediment types (e.g., gravel or sand) with rooted aquatic plants. Excessive watershed erosion can transport large amounts of fine sediment into streams, leading to frequent bed mobility and poor instream habitat.

Metric 8. Middle Canopy Layer Along Stream Bank

The portion of the middle canopy layer measures the amount of stable vegetative protection. This parameter supplies information on the ability of the bank to resist erosion as well as some additional information on the uptake of nutrients by the plants, the control of instream scouring, and stream shading.

Metric 9. Percent Pools.

This rates the overall mixture of pool types found in streams, according to size, depth, and type. A stream with many pool types will support a wide variety of aquatic species. Rivers with low sinuosity (few bends) and monotonous pool characteristics do not have sufficient quantities and types of habitat to support a diverse aquatic community.

Metric 10. Percent Barren Banks.

This metric measures the lack of the amount of vegetative protection and looks at the stream bank and the near-stream proportion of the riparian zone. The root systems of plants growing on stream banks help hold soil in place, thereby reducing the amount of erosion that is likely to occur. This parameter supplies the amount of erosion that is likely to occur. Banks that have full, natural plant growth are better for fish and macroinvertebrates than are banks without vegetative protection or those shored up with concrete or riprap. In areas of high grazing pressure from livestock or where residential and urban development activities disrupt the riparian zone, the growth of a natural plant community is impeded and can be extended to the bank vegetative protection zone.

4.3.1 NHI Scoring Methods.

The data sets were scored individually by ecoregion. For each ecoregion, reference sites were used as the basis for calibration and the metrics were give scores of one, three, five, or seven. A score of one was given to raw data scores that were 12 percent or lower of the reference site distributions, a score of three as assigned to raw data scores between 13 and 25 percent, a score of five was given to raw data scores between 26 to 50 percent of the reference distributions, and seven was assigned as the score to raw data score greater than 50 percent of the reference distribution. Total NHI scores were calculated by summing metric scores.

5. Reference conditions

Reference conditions are used to scale the assessment to the “best attainable” situation. This approach is critical to the assessment because stream characteristics will vary dramatically across different regions (Barbour and Stribling 1991). The ratio between the score for the test station and the score for the

reference condition provides a percent comparability measure for each station. The station of interest is then classified on the basis of its similarity to expected conditions (reference conditions), and its apparent potential to support an acceptable level of biological health. Use of a percent comparability evaluation allows for regional and stream-size differences, which affect flow or velocity, substrate, and channel morphology (Barbour et al. 1999).

Initially, several hand picked reference sites were chosen for each river basin that were thought to be the best attainable for the river basins. These sites were used for comparison with the random sites. When the initial statistical comparisons for CDF metrics for the fish, macroinvertebrates and habitat from the initial reference sites were compared with the random sites, some overlap was noticed when comparing the results of the scores of indexes and individual metrics between the initial reference sites and random sites. Because of the overlap in individual metrics and index scores for fish, macroinvertebrate and habitat, it was decided to throw all sites into the pool of reference sites and select the best of the sites to be used for reference. The criteria used for picking reference sites during this second round included taking the Habitat Index score of greater than 38 and including them in a pool of sampling sites sorted by ecoregion and stream type. From this second reference site list, sites were picked only where the Fish IBI scores were greater than 48 and an Invertebrate Index IBI score of greater than 14 (Table 6). Sites were also grouped into stream size and cold/warm water streams for each ecoregion. The number of reference sites were chosen for each stream grouping from a binominal table giving the minimum number of sites needed to represent each ecoregion and stream grouping. Sampling sites were not placed in the reference site pool if 1) a fish IBI or a macroinvertebrate ICI was missing, 2) The drainage area was not wholly within the ecoregion, 3) the site was not typical of the surrounding ecoregion, 4) the stream was channelized, 5) an impoundment was located within five miles above the site and had an impact on flow regime, 6) a sewage treatment plant was located five miles above the site, 6) a known spill or contaminant event within the past three years, and 7) high urban or commercial development in the drainage area above the sampling location. However, in spite of these limitations, the reference site list will be considered an evolving process and will be periodically reviewed to ensure the population of reference sites meets basic requirements for the stream groupings and representation.

The sites were sorted then by ecoregions. All ecoregions appeared to be valid divisions using Duncan's ANOVA tests on the individual metrics, individual metric scores, and total scores for fish, macroinvertebrates, and habitat (Tables 7, 8, and 9). However, a better fit appeared when Ecoregion 27 (Central Plains Ecoregion) was subdivided into eastern and western units using Ecoregion IV subdivisions (See Figure 1). The eastern Ecoregion 27 (renamed Ecoregion 271) consisted of subecoregion 27a (Smokey Hills) and 27f (Rainwater Basin Plains) and has fauna and habitat similar to Ecoregion 47 (Western Corn Belt Plains). The western Ecoregion 27 consisted of subecoregions 27b (Rolling Plains and Breaks), 27e (Central Nebraska Loess Plains) and 27g (Platte River Valley) and was more similar to Ecoregion 25 (Western High Plains) (Table10).

6. Data Analysis and Interpretive Methods

6.1 Results

There were a total of 202 sites surveyed throughout the state during the 1997-2001 R-EMAP project (Table 1). These included 147 random sites and 55 reference sites (Table 6, Figures 2 and 3). Sites were located in all six ecoregions of the state, with 24 in the Western High Plains Ecoregion (Ecoregion 25), 60 in the Central Great Plains Ecoregion (27), seven in the Northwestern Glaciated Plains Ecoregion, seven in the Northwestern Great Plains Ecoregion (43), 23 in the Nebraska Sand Hills Ecoregion (44), and 80 in the Western Corn Belt Plains Ecoregion (47). Sites were distributed through the 13 river basins: ten in the Big Blue Basin, 21 in the Elkhorn Basin, two in the Hat Creek Basin, ten in the Little Blue Basin, 18 in the Loup Basin, 20 in the Lower Platte Basin, 12 in the Middle Platte Basin, 20 in the Missouri Tributary Basin, 20 in the Nemaha Basin, 18 in the Niobrara Basin, 15 in the North Platte Basin, 21 in the Republican Basin, 12 in the South Platte Basin, and two in the White River Basin. Most streams (87%) surveyed were first through third order streams.

The primary method for evaluating metric and index evaluations was cumulative distribution frequencies (CDF). CDF is a method of plotting the environmental data from a population of sites in order to describe the characteristics of the population. Examples of the CDF plots are shown in Figure 4, through 9 representing the fish, macroinvertebrate, habitat, water chemistry, sediment chemistry, and fish tissue chemistry data. With adequate sample size it is possible to define subpopulations based on the gradient of condition. The sites at the low end of the range for a given indicator are further from the nominal condition than sites at the high range (Herger and Hayslip 2000). CDFs present the complete data population variation and allow one to estimate the proportion of the population above or below a particular value (Larson and Christie 1993). The advantage of this method is that the complete data for the population is presented with uncertainty estimates. Because value judgments are not imposed, different criteria for evaluating the data can be used (Larson and Christie 1993). Details of the statistical foundation for EMAP methods are in Diaz-Ramos et al. (1996). Box plots are used for distributional data when a low number of sites are not adequate for a meaningful CDF use. Ecoregional CDF plots are not given due to the large number of plots and the fact that some ecoregions did not have enough sites for statistical analysis.

6.2 Fish

A total of 50 fish species were collected during the 1997-2001 R-EMAP sampling (Table 4). Fish species collected within each family consisted of 1 Lepisosteidae (Gar), 1 Clupeidae (Herring), 2 Salmonidae (Trout), 18 Cyprinidae (Minnow), 4 Catostomidae (Sucker), 6 Ictaluridae (Catfish), 2 Fundulidae (Topminnows), 1 Poeciliidae (Livebearers), 2 Moronidae (Temperate Bass), 6 Centrarchidae (Sunfish), 4 Percidae (Perch), and 1 Sciaenidae (Drum). Three state sensitive species were collected: Brook stickleback, Iowa darter, and Orangethroat darter. The most commonly collected fish were the Sand shiner (22% of total fish collected), Bigmouth shiner (19%), Plains killifish (10%), and Red shiner (10%). The other 46 fish species were collected in less than four percent of the time from the sampling locations.

The distribution of the major fish families within the EPA ecoregions in Nebraska is shown in Table 11. Cyprinidae, Centrarchidae, and Ichtaluride were the codominants in the eastern and south-central ecoregions, while Cyprinidae, Catostomidae, and Centrarchide were the most abundant in the sand hills and northwestern Nebraska. Fundulidae, Catostomidae, and Cyprinidae were most numerous in the western ecoregion. Salmonidae were the most numerous in the cool water streams of the Northwestern Great Plains and Sand Hill Ecoregions.

Species richness per collection site ranged from 0 to 23 (Table 12). The highest number of richness was found at Elkhorn River near ONeil in Holt County and Holt Creek near Emmit in Holt County. No fish were collected at an unnamed Tributary to South Creek near Martinsburg in Dixon County, an unnamed Tributary to Pebble Creek in Cuming County, and an unnamed Tributary to Logan Creek near Pender in Thurston County, Ervine Creek in Cass County, and the Highline Canal in Duel County. The first three streams were either too small or too shallow to sustain a fishery population at the time of sampling. Ervine Creek had a culvert below the sampling site whose elevation prevented fish migration. Highline Canal is dewatered during the fall and winter months of the year, so fish populations are very limited. The upper sampling site on Beaver Creek (C) near Beaver City in Furnas County was dry at the time of sampling.

The highest scoring metric was the total number of native families and the lack of alien species at several sites. The lowest scoring metric on average was the number of sensitive species, which would indicate the low number of sensitive species found at several sites, especially the eastern ecoregions.

IBI scores ranged from 32 to 90 (Table 13). Overall, the average IBI score for the state was 56.9 for the perennial streams and 61.1 for the reference streams (Figure 10). Each of the ecoregions varied in the range of IBI scores, but, in general, the eastern ecoregions (47 and 271) where slightly lower than the rest of the state. The mean IBI scores were not significantly different between ecoregions for both perennial and reference streams. Of the middle and western ecoregions, the Northwestern Glaciated Plains (Ecoregion 42) had the highest overall IBI scores (73 for perennial streams and 77.1 for reference streams). For the middle and western ecoregions, the perennial streams in Ecoregion 25 (Western High

Plains) had the lowest average IBI score of 62.2 and the reference streams in Western High Plains (Ecoregion 25) had the lowest western IBI stream score (59.8). The eastern ecoregions IBI mean scores for perennial and reference streams were 51.7 and 68.8, respectively, in Ecoregion 271 (Eastern Central Great Plains) and 50.9 and 60.4, respectively, in Ecoregion 47 (Western Corn Belt Plains).

The fish IBI box plot distributions and IBI CDF plots are shown in Figure 10 and 11. In general, the CDFs from the reference sites have slightly higher scores than the perennial sites for all the sites combined. The box plots of the reference sites versus the perennial sites in each ecoregion generally show that the reference sites have higher median scores than the perennial site, except in ecoregion 27. The difference in ecoregion 27 from the other ecoregions is due to the number of good sites in western part of the state. The other index scores kept the sites out of the reference site list.

6.3 Macroinvertebrates

All ICI scoring are based on combined macroinvertebrate sampling. Because the streams of the state are not uniform, in regards to substrate and habitat types, different types of sampling methods (Hester-Dendy - 165 total samples; overhanging vegetation – 133 total samples; pool and bottom substrates - 111 total samples; riffles – 75 total samples; and, qualitative – 175 total samples) were combined by station then evaluated. Because not all habitats and sampling methods for each stream were present, the taxa list from each sampling method was combined to form a total invertebrate list. A total of 573 macroinvertebrate taxa were collected from 1997-2001 (Table 3). Species richness per collection site ranged from three in the Big Blue Basin at Turkey Creek (B) near Geneva in Fillmore County and 89 in the Lower Platte Basin at an unnamed Tributary to Middle Creek near Garland in Lancaster County. The most abundant organisms varied with the ecoregion of the state (Tables 14 and 15), however, the most abundant taxa for the whole state were the Chironomidae or midges (*Cladotanytarsus, Cricotopus, Dicrotendipes, Glyptotendipes, Parakiefferiella, Parametriocnemus, Polypedilum, Rheocricotopus, Rheotanytarus, Tanytarsus, and Thienemannimyia*), the hydropsycid caddis flies (*Hydropsyche, Ceratopsyche*, and *Cheumatopsych*e), the naidid worms (*Dero* and *Nais*), the mayflies (*Baetis, Caenis, Fallceon, Hepagenia, Stenacron,* and *Tricorythodes*), the tubificid worms (*Limnodrilus* and immature Tubificidae without capilliform chaeta), and the simuliid black flies. Tables 14 and 15 also show which genera consisted of more than one species per group.

ICI scores (BugSc in table) ranged from 4 to 28 (Table16). The average ICI score for the state was 16.5 for the perennial streams and 20.8 for the reference streams (Figure 12). Except for the Sandhill ecoregion, the random perennial mean and median scores were at least three points lower than then reference mean and median scores. The highest scoring ecoregion was the Nebraska Sandhills (ecoregion 44) for the randomly selected perennial streams (mean ICI score 20.8). The highest scoring reference streams were the Northwestern Glaciated Plains (ecoregion 42) and the Nebraska Sandhills (ecoregion 44) with the mean reference ICI scores of 24 and 23, respectively. The eastern and western ecoregions had similar ICI scores for both the perennial and reference stream sites, except for the Nebraska Sandhills. Seven metrics or metric scores showed a significant difference between ecoregions when testing for perennial streams and five significant differences showed up between ecoregions when testing for reference streams (Table 9). The total number of invertebrate species and the percent contribution of dominant taxon were the only two significantly different metrics that were common between the randomly selected perennial and reference streams.

The macroinvertebrate box plot distributions and ICI CDF plots are shown in Figure 12 and 13. In general, the macroinvertebrate metric CDF plots comparing the reference sites from the random perennial sites show the ideal CDF pattern where there is very little overlapping between the two data sets. A good example of the ideal pattern is shown with the ICI macroinvertebrate index score, the total number of macroinvertebrate species (Figure 5), and the EPT taxa richness (Figure 14). Some overlapping of the CDF scores occurs with the Hilsenhoff biotic Index metric and the percent dominant taxon metric. The few overlapping CDF plot sites would indicate that the reference sites were distinctly different from the randomly selected sites and are good selections for reference sites. The distributional box plots (Figure

13) and the distribution of the ICI score and individual metrics by ecoregion (Table 16) shows the variability of patterns of the different ecoregions of the state.

6.4 Physical Habitat

The physical attributes of habitat play an integral role in the health of the different communities of a stream. Of the 188 possible measured or calculated habitat metrics (Kaufman et al. 1999), 10 were found to show the most significance on a statewide basis using stepwise discriminate analysis. The 10 metrics also correlated best with the IBI score, ICI score and the individual metrics for each index (Table 17). The 10 habitat metrics can be divided into the following categories: Land use metrics—percent row crops; Channel/streambank metrics—incision/width ratio, portion of middle canopy layer, and percent barren banks; Instream habitat metrics—percent riffles, percent pools, percent overhanging vegetation, and percent undercut banks; and Substrate metrics—percent sand, and percent fines.

The Nebraska Habitat Index (NHI) scores ranged from 20 to 54 (Table 18). The average NHI score for the state was 32 for perennial streams and 46 for reference streams. The NHI score varied with each of the ecoregions, but, in general, the perennial streams from the Western Corn Belt Plains (47), the Eastern Central Great Plains (271) and the western Central Great Plains (27) ecoregions had the lowest NHI scores (Table 19, Figure 15). The mean perennial stream NHI scores were significantly different between ecoregions and formed three groupings: Ecoregion 42; Ecoregions 44, 43, 25 and 27; and Ecoregions 47, 271, 27, 25 and 43 (Table 19). The reference stream NHI scores were significantly different between ecoregions and formed 2 strong groupings: Ecoregion 47 and Ecoregion 25, 44, 42, 27, 271, and 43 (Table 20).

The NHI CDF plots are shown in Figure 16. In general, the reference site CDF plots showed higher distributions than the perennial sites and showed very little overlap within the 95% confidence lines. This would indicate that the sites selected as reference sites are the best sites in the basins and are good choices for reference sites.

6.5 Chemistries - water quality

Data for 39 water quality and field variables were collected from 202 sites of which 147 were perennial stream sites and 55 were reference sites. Summary statistics for all water chemistry parameters are in Table 21 and are divided into perennial and reference streams. These results were compared to current water quality standards of Nebraska shown in Table 22. Because sites were not sampled several times over a timeframe and timing of sampling was not intended to capture the peak or lowest concentration of chemical indicators, water quality standards cannot be strictly applied to these samples. Data interpretation reflects a single view in time. High concentrations above the standard values may indicate that further study is needed. The list of stations that exceeded the state's standards are summarized in Tables 23, 24, and 25 with a more detailed description and distribution plots given below for selected important chemical constituents.

The correlations between the chemical and field parameters and the habitat, fish, and macroinvertebrate indices are shown in Table 26. Of the 52 chemical and field constituents sampled, a high Pearson correlation coeffiecent ($r > 0.19$) with high probabilities ($p < 0.05$) were found with all three indices 12 times, ten times with two indices, 12 times with one index and 19 constituents showed no correlation. No consistent pattern was identified, however the nutrient and pesticide related water quality variables showed a stronger correlation with at least one of the the indices. The pesticides had the strongest correlationship ($r > 0.40$) with the Habitat Index. Silver, phosphorus, metolachlor and chlorpyrifox had the highest correlation ($r > 0.29$) with the Fish IBI index, and conductivity, silver, and magnesium had the strongest correlation ($r > 0.29$) with the Macroinvertebrate ICI index.

6.5.1 Temperature

Because stream temperature is temporally variable and dependent on climatic conditions, a single measurement is of very limited value in characterizing streams conditions. Therefore, any conclusions of ecoregion wide summer temperatures have limited validity. Temperature ranged from 12 C to 30 C in coldwater streams and 14 C to 36 C in warm water streams (Figure 17 through 21). At the time of sampling, temperatures standards were exceeded for 17 of the coldwater sites and 11 of the warmwater sites.

6.5.2 Dissolved oxygen

Dissolved oxygen (DO) content is related to turbulence and temperature. Decreased DO levels are associated with inputs of organic matter, sedimentation, as well as increased temperature and reduced streams flow (Herger and Hayslip 2000). As with temperature, conclusions must be drawn with caution, as DO is temporally variable and a single measurement is of questionable value for characterizing streams condition. DO ranged from 4.8mg/l to 10.3 mg/l in coldwater streams and 0.42 mg/l to 14.7 mg/l in warmwater streams. The water quality standard for coldwater streams is 4 mg/l for a 1-day minimum and was not exceeded. The warmwater standard of 5 mg/l for a 1-day minimum was exceeded at 11 sites (Figures 22 through 25).

6.5.3 pH

The pH of the R-EMAP study sites for both perennial and reference streams ranged from 6.5 to 9.7. Only one site (Republican River (B) [Station number 009729]) was above the Nebraska standards of 6.5 to 9 (Figures 26 and 27).

6.5.4 Phosphorous

Phosphorous as phosphate is one of the major nutrients required for plant nutrition and is essential for life (EPA, 1976). An excess of a critical concentration, phosphates can increase the amounts of algal growth. Although there are no state standards, EPA (1986) recommends <50 mg/l total phosphorous for streams that deliver to lakes (Herger and Hayslip 2000). With this EPA level, 17 sites were above this level for the perennial streams and 2 reference streams were above the 50 mg/l level (Figures 28 and 29).

6.5.5 Nitrogen

Nitrogen is one of the most abundant elements and is found in the cells of all living things. Inorganic nitrogen may exist in the free state as a gas N_2, or as nitrate NO_3, nitrite NO_2, or ammonia NH_3. Organic nitrogen is found in proteins and is continually recycled by plants and animals. Nitrogen containing compounds act as nutrients in streams and rivers and, if sufficient phosphorus is available, high concentrations of nitrates will lead to phytoplankton and macrophyte production. There is no national standard for nitrate, but, in order to maintain designated use, AWWA (1990) suggests 90 mg/l Nitrates for warmwater fish and 100 mg/l Nitrate+Nitrite for agricultural use. All of the collection sites had Nitrate-Nitrite, and total Nitrogen levels below these limits (Figures 30 through 37).

6.5.6 Chemistries associated with pH and temperature -- Ammonia

Ammonia is a pungent, colorless alkaline compound of nitrogen and hydrogen that is highly soluble in water and is toxic to aquatic fauna. It is a biologically active compound that is present in most waters as a normal biological process of degradation and respiration. Ammonia chronic standard levels vary with pH, temperature, and aquatic life use classification of the stream. Out of the 202 collections, four sites were above chronic standard limits at the time of collection (Figure 38 through 44). Two of the sites were from Warmwater-B perennial sites and one was from a Warmwater-A reference stream. The last site was from a Special Ammonia Criteria Warmwater-B perennial stream.

6.5.7 Chemistries associated with water hardness

The water quality standard for various metals (Cadmium, Chromium III, Copper, Lead, Nickel, and Zinc) is dependent on water hardness. Nickel and zinc did not show any collection value above the chronic standard levels. Nickel concentrations varied from 6.23 to 22.8 mg/l for both the perennial and reference streams (Figure 45 and 46). Zinc concentrations were from 4 to 194 mg/l for perennial streams and 4 to 9.17 for reference streams (Figure 47 and 48). Even though three warmwater-B perennial sites had zinc concentrations above 100 mg/l, this was still below the hardness based zinc standard limit for warmwater-B streams. Two sites were above the chronic standard level for chromium. Chromium concentrations ranged from 3.69 to 282 for both perennial and reference streams (Figure 49 through 55). Copper had seven sites above chronic levels and lead had 36 sites above chronic levels (Figure 56 through 62). Copper varied from1.54 to 23.5 mg/l for perennial streams and 1.54 to 8.32 mg/l for reference streams. Copper was above the chronic standard level for four coldwater-B perennial streams, two coldwater-B reference streams, and one warmwater-B reference stream. Lead concentration levels were from 0.557 to 55.6 mg/l for perennial streams and 0.45 to 13.5 mg/l for reference streams (Figure 63 through 69). Lead has the highest number of sites above chronic standard levels and consisted of six exceedances in coldwater-B, nine in warmwater-A, and eight in warmwater-B perennial streams. Reference streams had eight exceedances in coldwater-B streams, 4 in warmwater-A streams, and one in warmwater-B streams for lead. No analysis could be made for cadmium because the detections limits were higher than the chronic standard levels. The range of values varied from no detection to 1.57, with a detection value of one.

6.5.8 Selenium

Biologically, selenium is an essential, beneficial element recognized as a metabolic requirement in trace amounts for animals but toxic to them when ingested in amounts ranging from about 0.1 to 10 mg/kg of food. The national levels of selenium in water are proportional to the selenium in the soil (EPA 1976). In the R-EMAP Nebraska streams, selenium concentration varied considerably and often exceeds both the chronic and acute standards (Figure 70 through 73). Table 25 shows the 33 collections were higher than the chronic standard for perennial streams and 6 collections higher than the chronic standard for reference streams. Dissolved filtered selenium showed 28 collections higher than the chronic standard for perennial streams and 4 collections for reference streams.

6.5.9 Pesticides

Chlorpyfos was found to exceed the chronic standard in 88 perennial samples and 36 reference samples (Figures 74 and 75, Table 25). Both stream types varied from 0.01 to 0.3 mg/l, however, the detection limit (0.05 mg/l) was slightly above the chronic standard level (0.041 mg/l) and was included in the list of stations where the collections were over the chronic standard limit. Chlordane was found at all sites but the detection level was above the chronic standard level, so no evaluation was made. Other commonly used pesticides that were tested for but were also below standards levels for both perennial and reference streams were: alachlor, atrazine, metalochlor, and propachlor.

7. Chemistries – sediment

The NDEQ has not adopted water quality standards for sediment, however, a comparative review of the data can be based on the sediment screening guidelines developed by the Coastal Protection & Restoration Division of NOAA (revised 1999). The comparative values used for this assessment were the Probable Effect Levels (PEL's) from the NOAA Screening Quick Reference Tables or SQuiRTS. PEL's were derived from natural background levels in soils of the United States for inorganic contaminants and from risk-based Canadian soil standards for organic compounds. Since a PEL was not available for Heptachlor, the Upper Effects Threshold (UET) was used for this assessment. Neither PEL's nor UET's were available for some parameters. A summary of the compiled data and respective comparative values for perennial and reference sites are provided in Table 27 and 28. Sediments collected for R-EMAP were examined for a wide range of contaminants including solids, 10 metals, and 33 pesticides. Three sites

had arsenic and one site had lead above PEL levels (Table 29). The cause of the few elevated levels for these two trace elements is unknown. All of the stations, both perennial and reference stream sites, with pesticides with comparative criteria were above the PEL levels for Aldrin, Chlordane, DDD, DDE, DDT, Dieldrin, Endrin, Heptachlor, Heptachlor epoxide, and Hexachlorobenzene. The elevated pesticide levels most like reflect the agriculture practices throughout Nebraska.

8. Chemistries – fish tissue

Fish and other species can be exposed to contaminants through direct contact and consumption of contaminated sediments and/or prey species. These contaminants may be stored in the tissue of the fish over long periods of time. As contaminant levels bioaccumulate, they begin to either have direct effects on the individual animal or are passed on to other species, such as humans, that consume the contaminated organisms (Van Dolah et al. 2002). In Nebraska, fish consumption advisories for water bodies are issued when risk-based calculations indicate potential health problems for consumers. Nebraska bases its assessments on the premise that the consumer will ingest a weekly average of eight or more ounces of fish throughout a 70-year period. Nebraska finds it unacceptable if a one in ten thousand chance exists for an individual to become sick from ingesting contaminated fish; therefore Nebraska applies a 1 $X10^{-4}$ or 1:10,000 risk level (Callam 2004). The list of contaminants used for comparison is shown in Table 30.

Most states are utilizing some form of risk-based assessments (RBA) which is, or resembles, the EPA's risk assessment methodology that Nebraska applies. Many RBAs examine cumulative risk where the effect of each contaminate (i.e., carcinogen or non-carcinogen) is summed together to produce a risk level. Risk levels are then compared to the state's pre-established action risk level to quantify severity of impact. Cumulative risk assessments are believed to be conservative and very protective of human health (Callam 2004).

The fish species collected from 97 sites were: Channel Catfish, White Sucker, Common Carp, Largemouth Bass, or a Trout species. A summary of the fish tissue analysis is shown in Table 31. When comparisons were made to the RBA contaminants list Dieldrin exceeded maximum concentrations for safe consumption at six sites (Table 32). This is consistent with previous fish tissue monitoring programs in Nebraska when dieldrin was present in fish tissue in high enough quantities to proceed with a fish consumption advisory. By itself, dieldrin concentrations present in Nebraska fish rarely cause human health risk criteria to be exceeded, but given the cumulative risk calculations that Nebraska uses, they contribute towards the overall risk. Of the 2004 Nebraska's 39 advisories, eleven were primarily due to dieldrin and PCBs (Callam 2004). None of the other contaminant analytes exceeded the RBA list. It should be noted that whole fish, rather than just edible tissue was analyzed.

9. Stream Classification

The data from the 202 R-EMAP stations were grouped into their respective data type (habitat, fish, or macroinvertebrate), ecoregion, stream size, cold water stream, warm water stream, reference stream sites, and perennial stream sites. Stream size was divided into the groupings of small (<1 cfs), medium (1-10 cfs), large (10-100 cfs) and river (>100 cfs) (Table 2). Since this study has shown that stream ratings are different between ecoregions, it was necessary to have the classification scheme reflect this difference between ecoregions. Summary statistics (i.e., mean, median, 25^{th} percentile, 75^{th} percentile, etc.) within each group were calculated for the habitat scores, IBI fish scores, and ICI macroinvertebrate scores (Tables 13, 16, and 18). Box plots from both the perennial and reference groups were made for the Habitat Index scores, the IBI fish scores, and ICI macroinvertebrate scores where the reference sites were compared to the perennial sites (Figures 10, 12, and 15). To rate the perennial sites, the 75^{th} percentile and higher of the reference sites was given an excellent rating; the 0 percentile to 74.9 percentile of the reference sites was given a good rating. Below the reference site level, the median and above of the remaining perennial scores was as given a fair rating. The scores below the median of the remaining scores were given a poor rating. Figure 76 shows an example of the rating scales.

The IBI and ICI were the only indices used to give a final rating to the streams. The habitat index still needs further evaluation and review before it can be incorporated for stream ratings. When looking at the individual indices, IBI fish scores consisted of 84 excellent, 89 good, 15 fair, and 22 poor stream ratings and ICI macroinvertebrate scores had 81 excellent, 74 good, 30 fair and 19 poor stream ratings. For the overall stream ratings only the lowest rating of either the IBI (IBIuse) or ICI (ICIuse) scores was used (Table 33). Using these criteria for the overall rating, there were 40 excellent, 97 good, 35 fair, and 38 poor stream ratings. Distribution maps of these stream ratings are shown in Figures 77 through 80.

The full support stream ratings for the aquatic life use support will include everything with a fair, good, or excellent overall rating. The poor overall stream ratings will be established as the nonsupport use designations for the aquatic life use support, however, for the 303d listing, only those samples with poor ratings in both the IBI fish rating and ICI macroinvertebrate rating will be listed.

Ecoregional differences were not established for cold streams from the different ecoregions because of the insufficient number of collection sites of coldwater streams. The cold water streams from this study were grouped with the warm water streams.

10. Conclusions

Based on this study and similar studies in other parts of the country in Oregon (Whittier et al. 1988), Missouri (Jones et al. 1988), Ohio (Larson et al. 1986, Ohio EPA 1987) and Iowa (Wilton 2005), Omernik (1987), and Omernik and Gallants's (1987) original work on the conterminous United States and Chapman et al. 2001 map of the ecoregions of Nebraska and Kansas can serve as a basis for classifying Nebraska wadeable streams. However, the Central Great Plains (ecoregion 27) could be split into western and eastern halves because of the similarity of fauna and the land use between the Western Corn Belt Plains (ecoregion 47) and the eastern Central Great Plains (ecoregion 271). The Western High Plains (ecoregion 25) and the western Central Great Plains (ecoregion 27) are also more similar in fauna and land use. Discriminate analysis of habitat, fish, and macroinvertebrate data also suggests this split. In general, streams, habitat, and fauna in the streams within an ecoregion tend to be like other streams in that ecoregion and unlike streams in other ecoregions. Transition regions have transitional characteristics of adjacent ecoregions (e.g., the Central Great Plains [ecoregion 27/271] and the Northern Glaciated Plains [ecoregion 42]).

Both the fish and macroinvertebrates reflect habitat quality of streams in Nebraska. The macroinvertebrates appear to be more sensitive to impacted streams though a reduction in both density and taxa present. The IBI fish metrics also reflect impacted streams, but because of the fish's ability to quickly move from a threat, the IBI is not quite as responsive as the macroinvertebrate ICI. The macroinvertebrates, in general, are not as mobile as the fish and become more reflective of the nature of a stream. The similarity of both groups allows a cross check of the stream classification and analysis.

The correlations between the Habitat index and the IBI, ICI and their metrics were greater than 20% in 19 out of 29 metrics (Table 17). Even with this relationship, the Habitat Index (HBI) was not used in the streams classification because more data is needed for verification, especially in the ecoregions with few sampling sites. The HBI still gives us a good indication of what the stream is like in comparison to other streams in the ecoregion and in other ecoregions. There is an obvious difference between the typical highly channelized, no instream habitat stream and the sinuous, uncut bank, log filled steam when looking at aquatic life. However, at this stage, more investigation is needed before we can use this index in stream classification.

Pearson correlations between the habitat, fish, and macroinvertebrate indices and the 52 chemical and field parameters did not show a consistant pattern, however, correlation coeffiecents were greater than 0.19 with three indices for 12 parameters, with two indices for ten parameters, and with one index for 12 parameters. No correlation with any index was shown for 19 chemical and field paramters.

The IBI and ICI appear to work well in the ability to assess stream health of low order streams in Nebraska, in spite of the diverse habitats and streams sizes. This study serves as a validation and calibration of this method for the larger ecoregions of Nebraska. Two ecoregions (42, the Northwestern Glaciated Plains, and 43, the Northwestern Great Plains) still needed confirmation for these indices, because of the low number of sites in these ecoregions.

11. Summary

1. A total of 202 sites were surveyed in Nebraska during a 5-year basin rotation R-EMAP survey. These sites included 55 reference sites and 147 randomly selected sites. The majority of streams surveyed were first through third order streams.

2. Fifty species of fish consisting of 12 families were collected in Nebraska. The highest number of species collected at on sites was 23, in the Elkhorn River Basin. The two most commonly collected fish of the state were the Sand shiner and the Bigmouth shiner. The Brook Stickleback, Iowa Darter and Organgethroat Darter were the three state sensitive species collected.

3. The IBI index consisted of eight metrics and averaged 56.9 for perennial streams and 61.1 for the reference streams in the state. Each ecoregion varied slightly from this average, with the eastern ecoregion (Western Cornbelt Plains or 47) having the lowest scores, overall. The Northwestern Glaciated Plains (ecoregion 42) had the highest IBI scores

4. There were a total of 573 taxa of macroinvertebrates collected during this study. Species richness varied from 3 in the Big Blue River Basin to 89 in the Lower Platte River Basin. The most abundant taxa were the midges, the hydropsychid caddis flies, naidid worms, mayflies, tubificid worm and simuliid black flies.

5. The ICI index consisted of four metrics and averaged 16.5 for the perennial streams and 20.8 for the reference streams across the state. The highest scoring ecoregion was the Nebraska Sandhills (ecoregion 44) and the Northwestern Glaciated Plains (42) for the perennial and reference sites, respectively.

6. The HBI index consists of ten metrics and were selected to show the best discrimination between good and bad sites and showed the best correlation between other indices. NHI scores averaged between 32 for perennial sites and 46 for reference sites. In general, the Western Corn Belt Plains (47), the eastern Central Great Plains (271) and the western Central Great Plains (27) had the lowest scores. The Nebraska Sand Hills (44) and the Western High Plains (25) had the highest NHI scores.

7. Data for 39 water quality and field variables were analyzed from each site and results were compared to the water quality standards. The chemical values cannot be strictly compared to the Nebraska water quality standards because several samples were not taken within a certain timeframe, however sites over the Nebraska standard limits may indicate future study. Temperature showed 17 coldwater sites and 11 warmwater sites above standards. Dissolved oxygen was under standards at 11 warmwater sites. Nitrogen levels are not over standards. Ammonia had five sites over standards. Other chemical constituents that were over standard limits are: Chromium – 2 sites; Copper – 7 sites; Lead – 36 sites; Selenium – 39 sites; and the pesticide, Chlorpyfos – 124 sites.

8. Sediment chemistries were analyzed for ten metals and 33 pesticides. NOAA Screening Quick Reference Tables (SQuiRTS) were used for comparison because Nebraska does not have sediment standards. Chemical constituents that were over the SQuiRTS levels included: Arsenic – 3 sites and Lead – 1 site. All of the stations had levels above the SQuiRTS levels for the following pesticides: Aldrin, Chlordane, DDD, DDE, DDT, Dieldrin, Endrin, Hepachlor, Heptachlor

epoxide, and Hexadhlorobenzene. This is most likely a reflection of the agriculture practices throughout Nebraska.

9. For fish tissue, Dieldrin exceeded maximum concentrations for safe consumption at six sites using risk-based assessments methods for Nebraska. This was consistent with previous fish tissue monitoring programs in Nebraska. None of the other contaminant analytes exceeded the risk-based assessment list.

10. The IBI and ICI were the only indices used for streams classifications. The evaluations are based on the reference site criteria. It was felt that the habitat still needs more evaluation before being used for streams rating, although the Pearson correlations were good between the IBI and ICI and the two indices metrics. The lesser score or value of the two indices is used when giving a stream rating. Using these criteria for the overall rating, there were 40 excellent, 97 good, 35 fair, and 38 poor stream ratings

12. References

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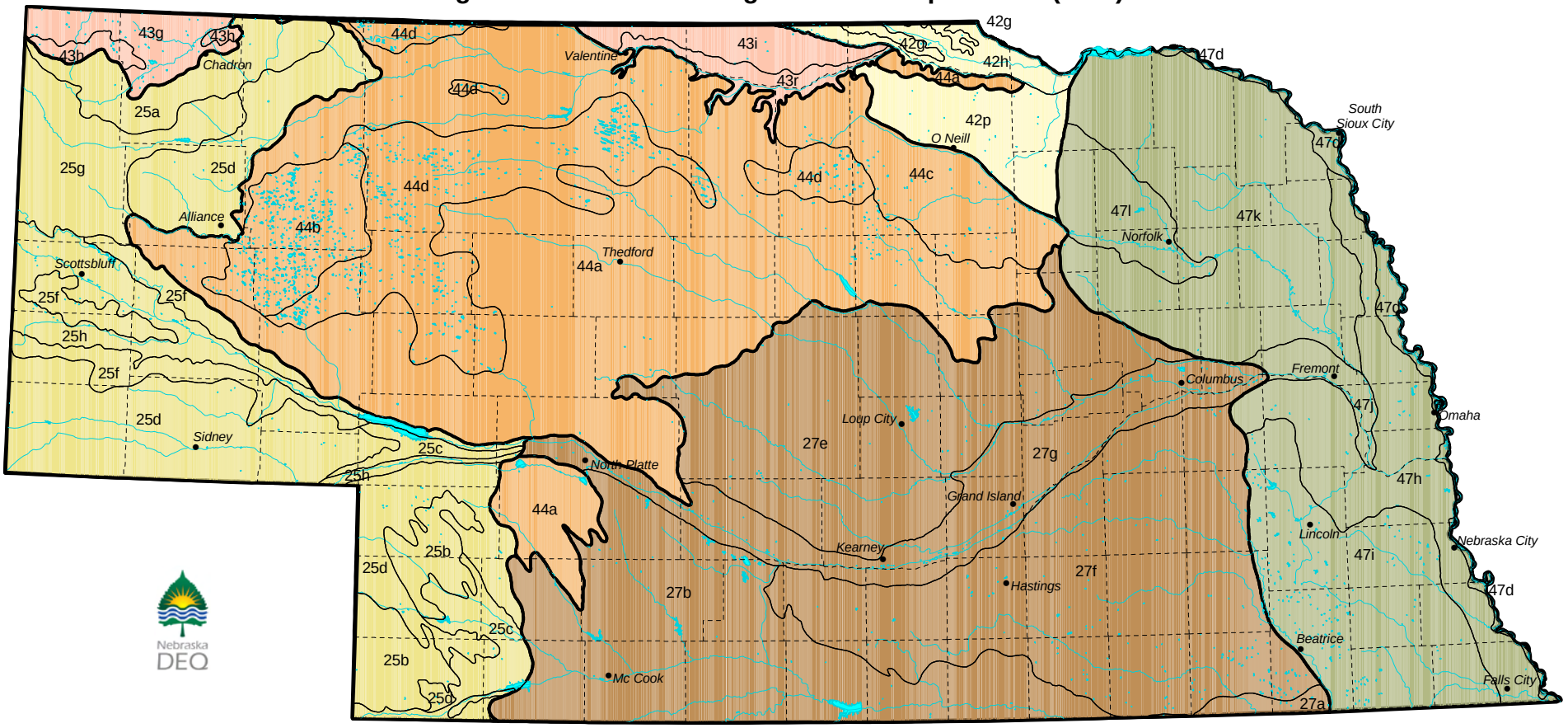
Figure 1: Nebraska Ecoregions from Chapman etal (2001)



Nebraska Ecoregions

25 - Western High Plains
- 25a - Pine Ridge Escarpment
- 25b - Rolling Sand Plains
- 25c - Moderate Relief Rangeland
- 25d - Flat to Rolling Cropland
- 25f - Scotts Bluff and Wildcat Hills
- 25g - Sandy and Silty Tablelands
- 25h - North and South Platte Valley and Terraces

27 - Central Great Plains
- 27a - Smoky Hills
- 27b - Rolling Plains and Breaks
- 27e - Central Nebraska Loess Plains
- 27f - Rainwater Basin Plains
- 27g - Platte River Valley

42 - Northwestern Glaciated Plains
- 42g - Ponca Plains
- 42h - Southern River Breaks
- 42p - Holt Tablelands

43 - Northwestern Great Plains
- 43g - Semiarid Pierre Shale Plains
- 43h - White River Badlands
- 43i - Keya Paha Tablelands
- 43r - Niobrara River Breaks

44 - Nebraska Sand Hills
- 44a - Sand Hills
- 44b - Alkaline Lakes Area
- 44c - Wet Meadow and Marsh Plain
- 44d - Lakes Area

47 - Western Corn Belt Plains
- 47d - Missouri Alluvial Plain
- 47h - Nebraska/Kansas Loess Hills
- 47i - Loess and Glacial Drift Hills
- 47j - Lower Platte Alluvial Plain
- 47k - Northeastern Nebraska Loess Hills
- 47l - Transitional Sandy Plain

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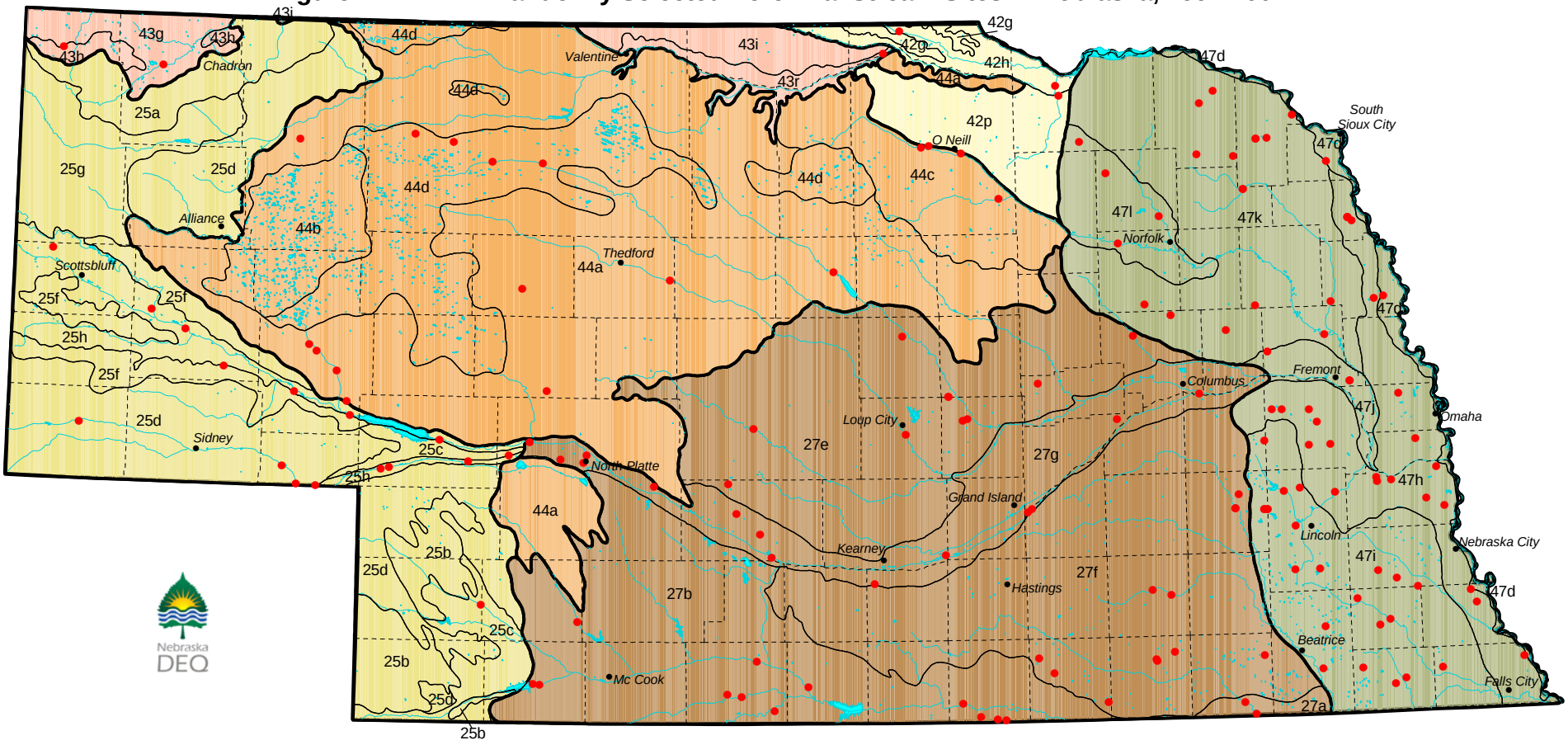
Figure 2: REMAP Randomly Selected Perennial Stream Sites in Nebraska, 1997-2001



Nebraska Ecoregions

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- 47j - Lower Platte Alluvial Plain
- 47k - Northeastern Nebraska Loess Hills
- 47l - Transitional Sandy Plain

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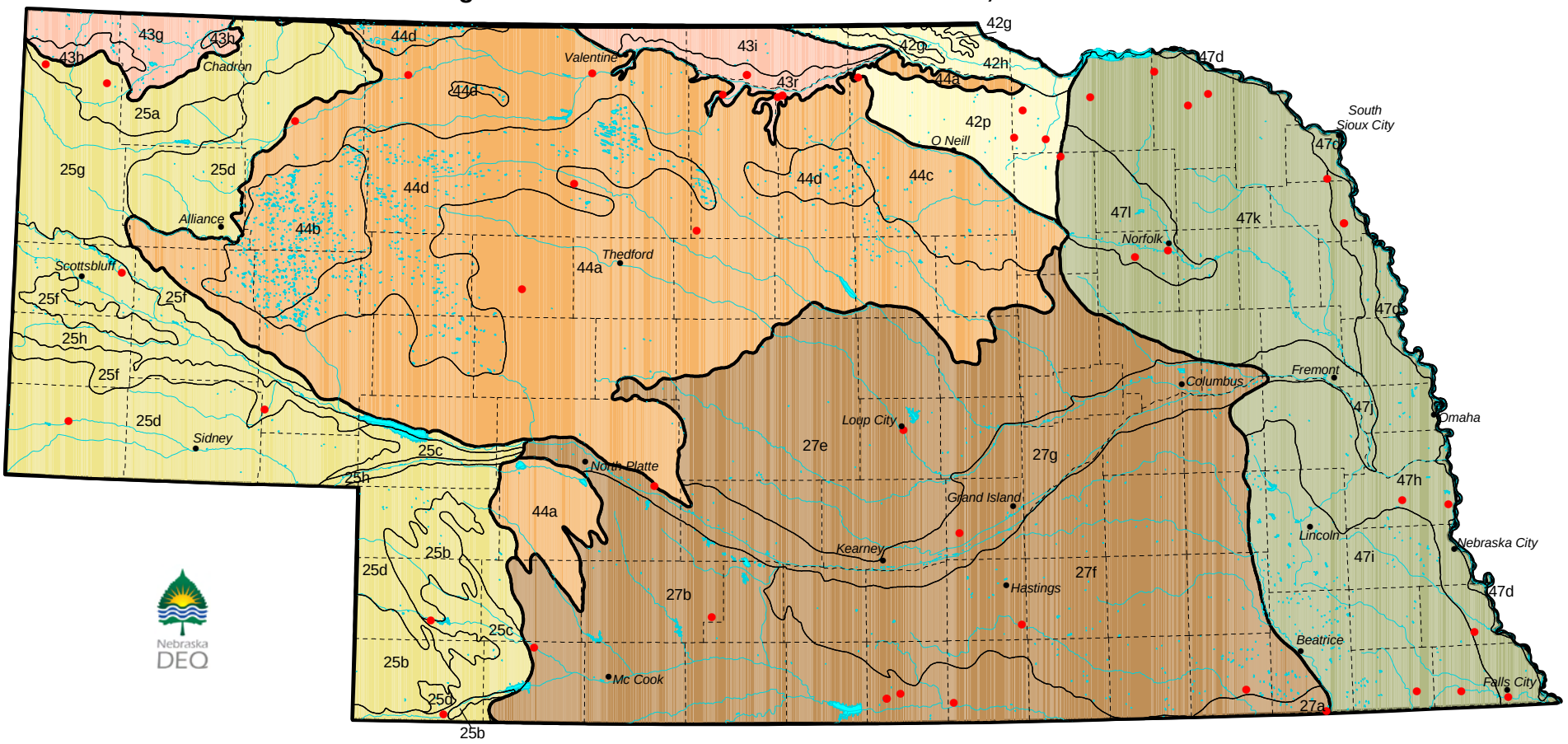
Figure 3: Reference Stream Sites in Nebraska, 1997-2001



Nebraska Ecoregions

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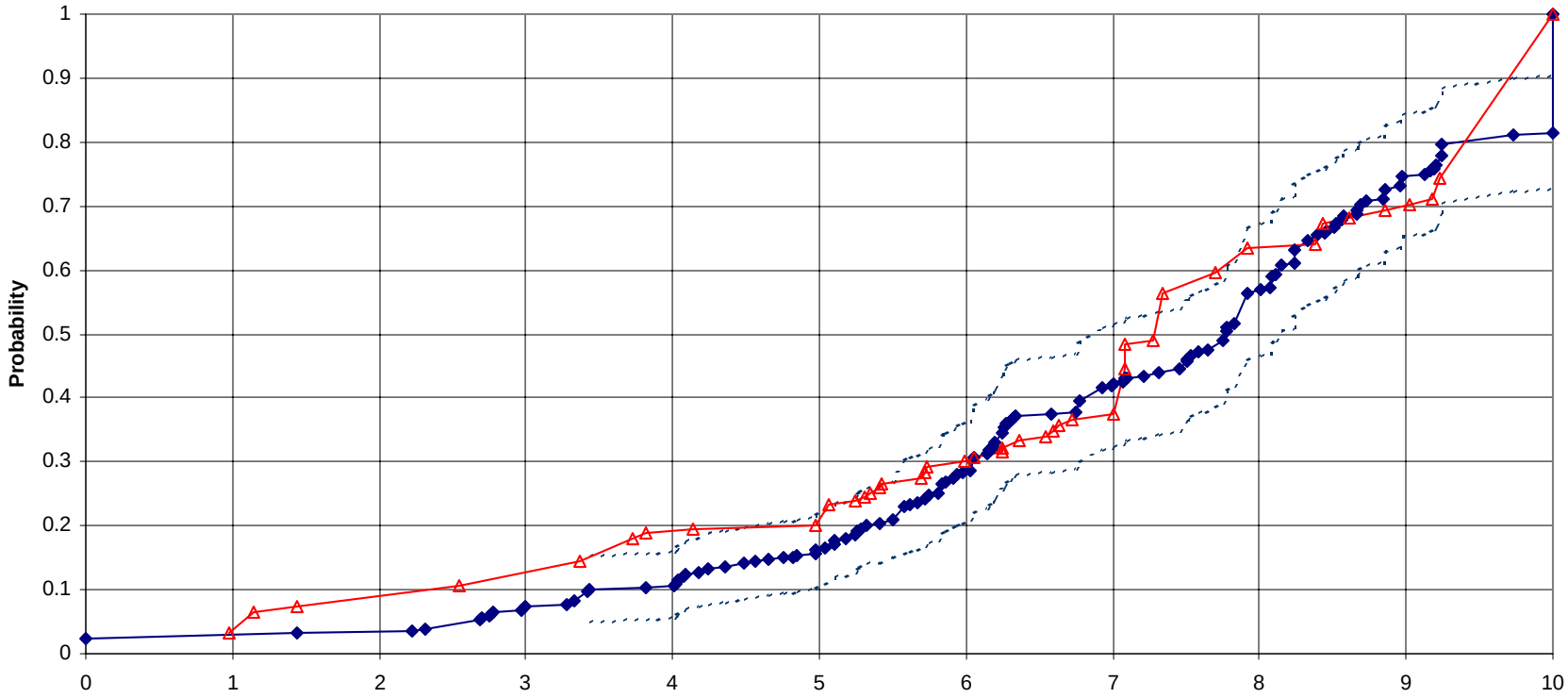
Figure 4. CDF Of The Total Number Of Native Species Metric Scores For All Nebraska Streams, 1997-2001 R-EMAP



Total number of native species metircs scores (natsp) - Dashed lines represent 95% confidence bounds - 150 perennial sites (solid blue markers) - 49 reference sites (open red markers)

Figure 5. CDF Of The Total Number of Macroinvertebrate Taxa For All Nebraska Streams, 1997-2001 R-EMAP

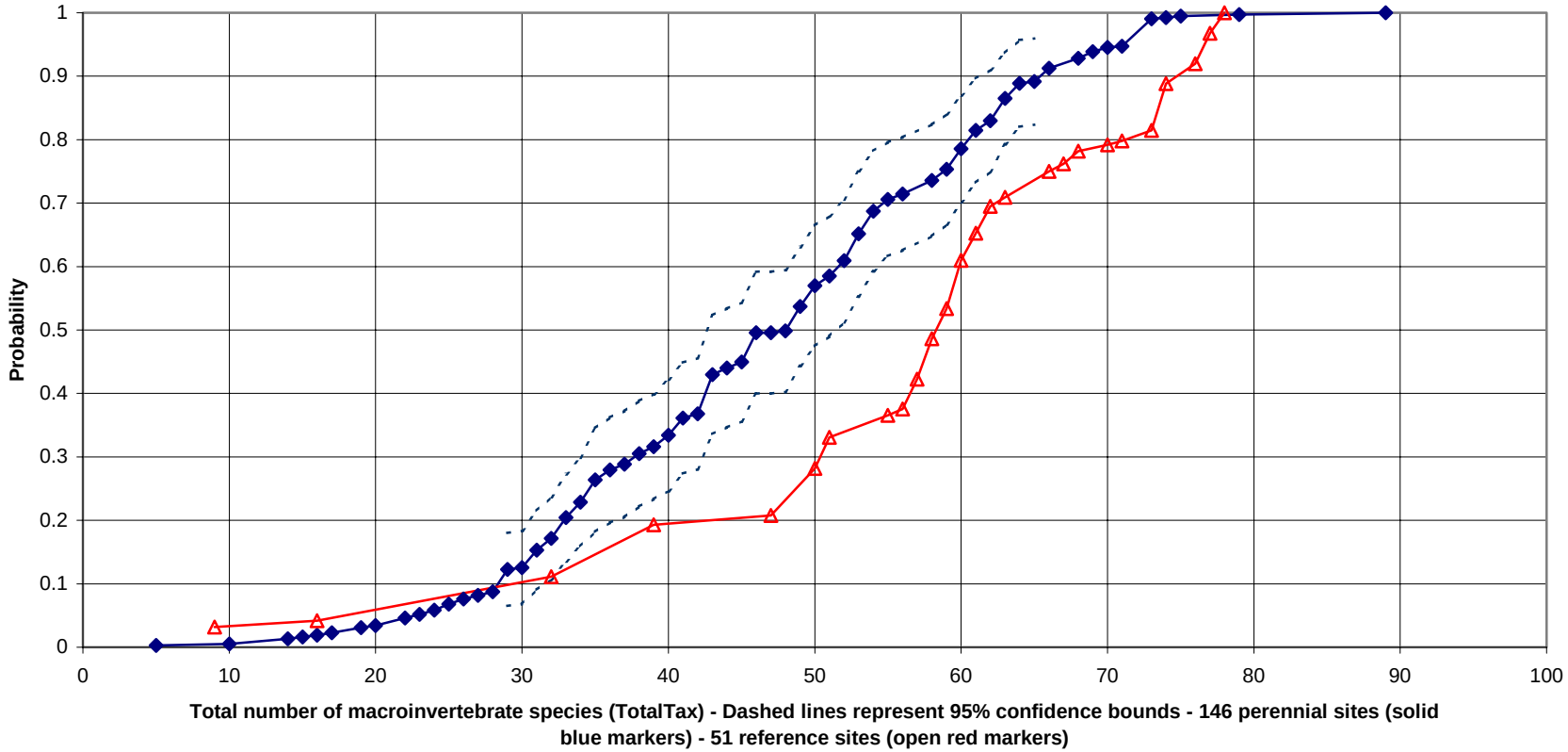


Figure 6. CDF Of The Proportion Of Overhanging Vegetation For All Nebraska Streams, 1997-2001 R-EMAP

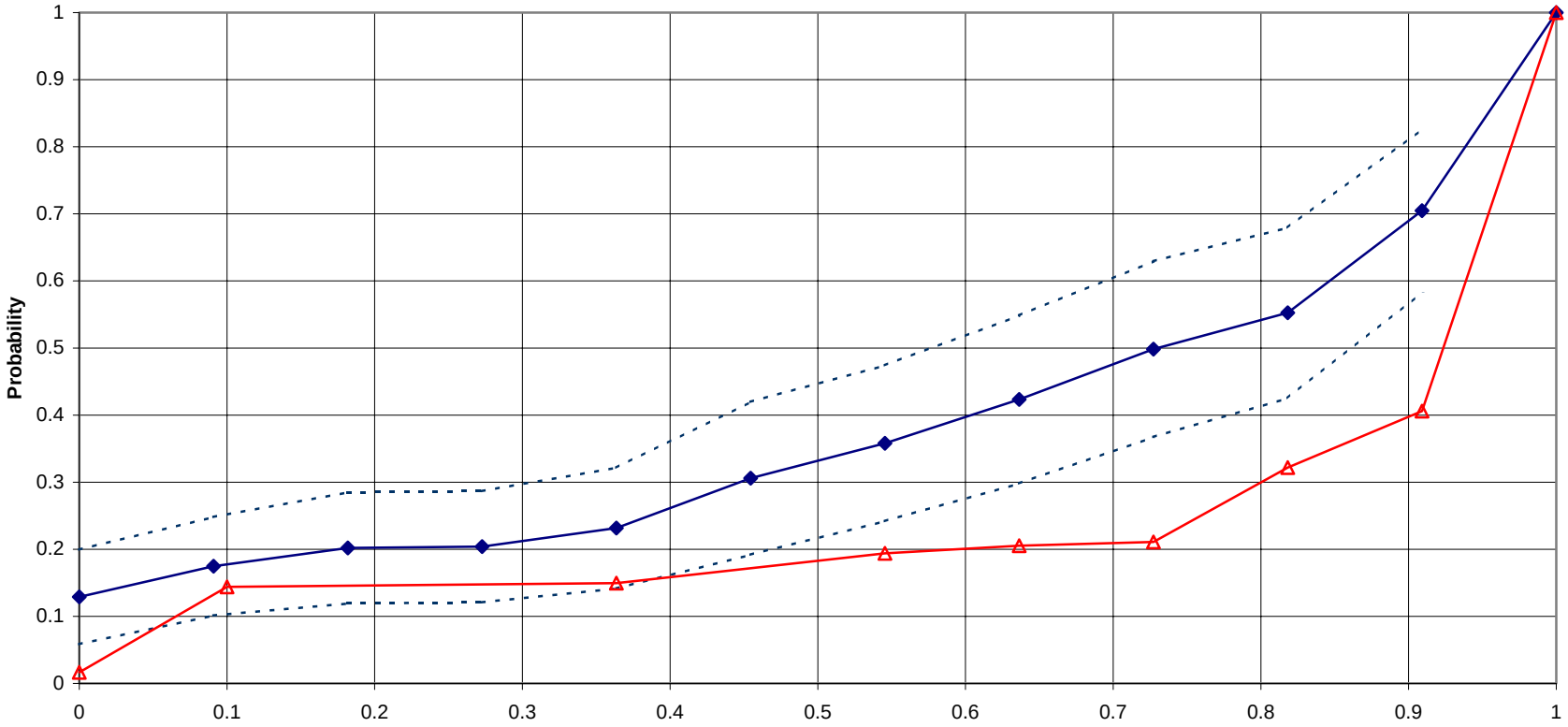


Figure 7. CDF of pH In Nebraska Streams, 1997-2001 REMAP

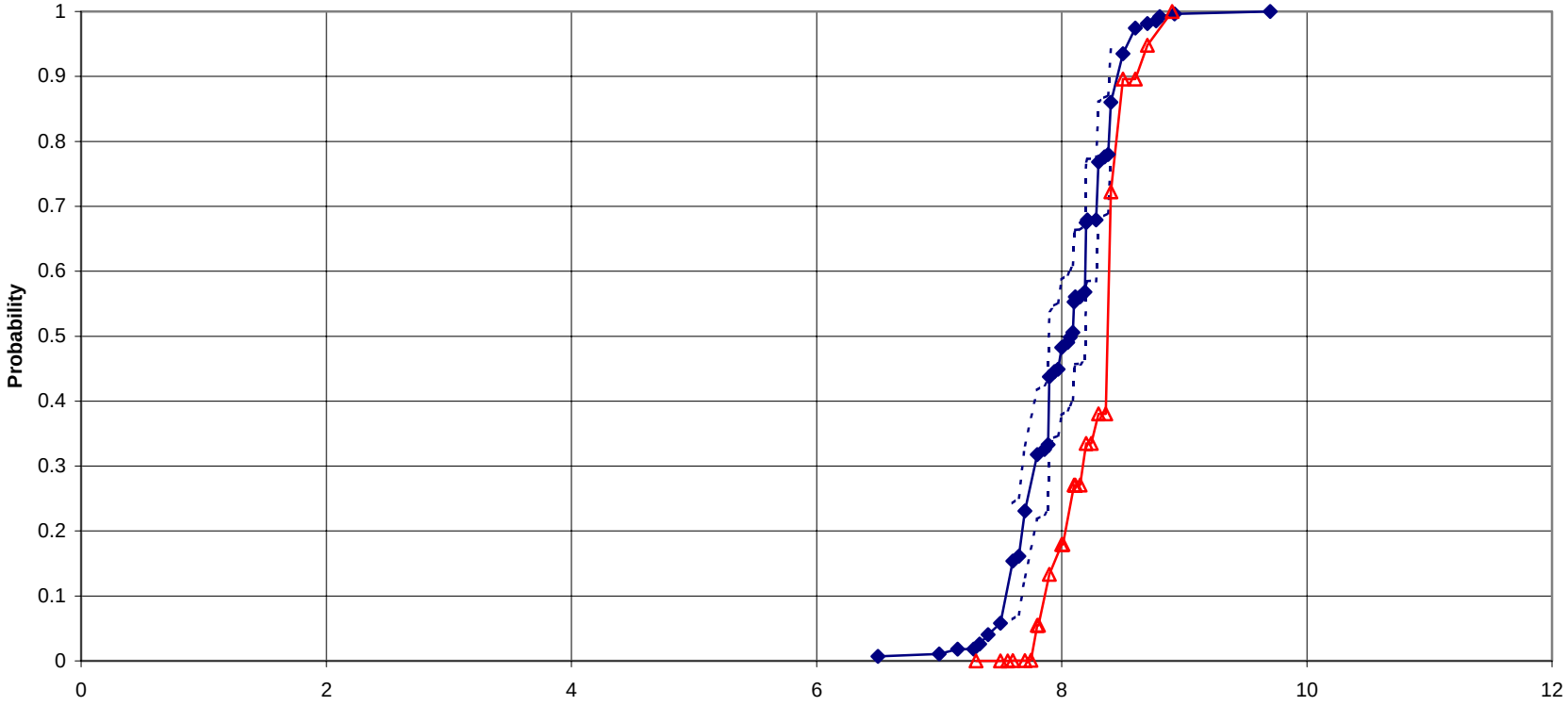


Figure 8. CDF Of Mercury In Sediment From Nebraska Streams, 1997-2001 REMAP

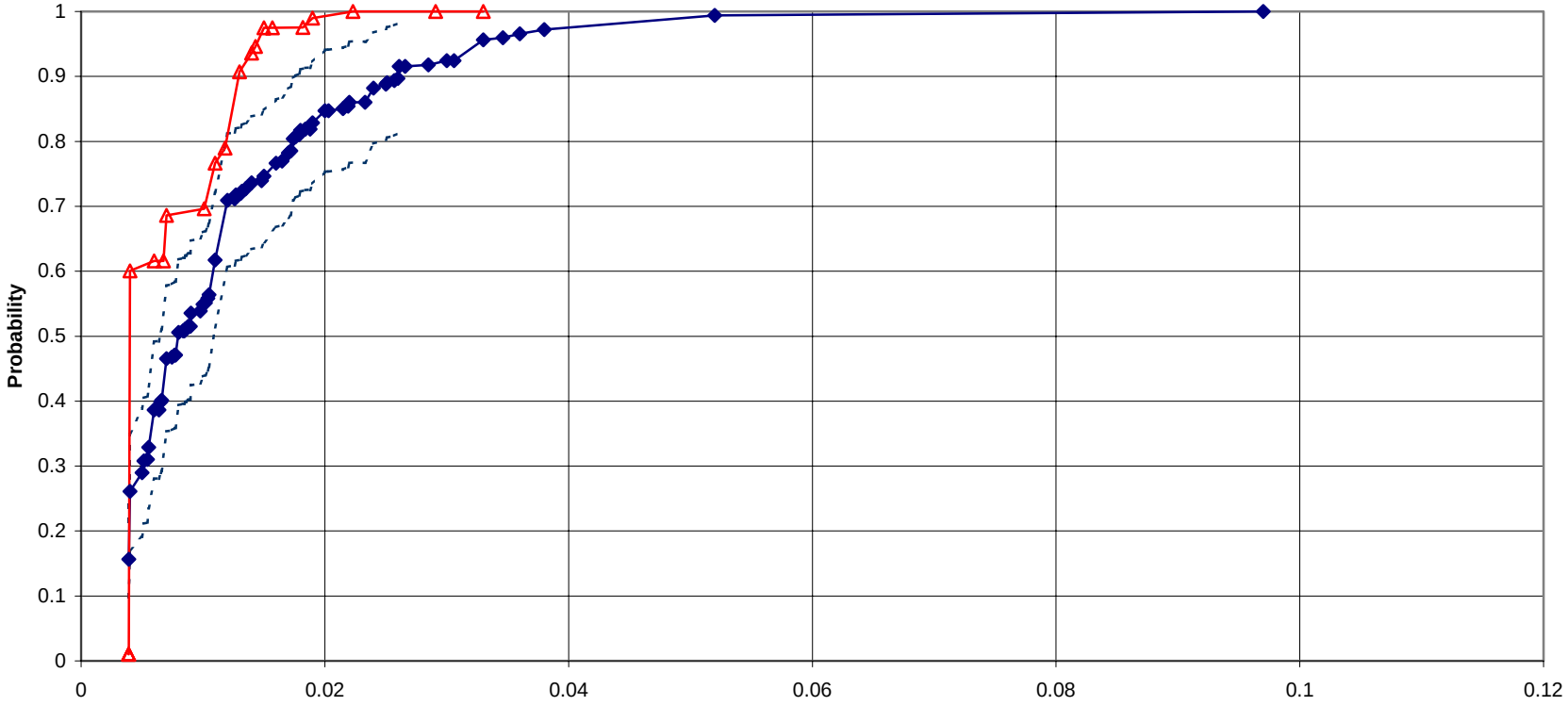


Figure 9. CDF OF Technical Chlordane In Nebraska Whole Fish, 1997-2001 R-EMAP

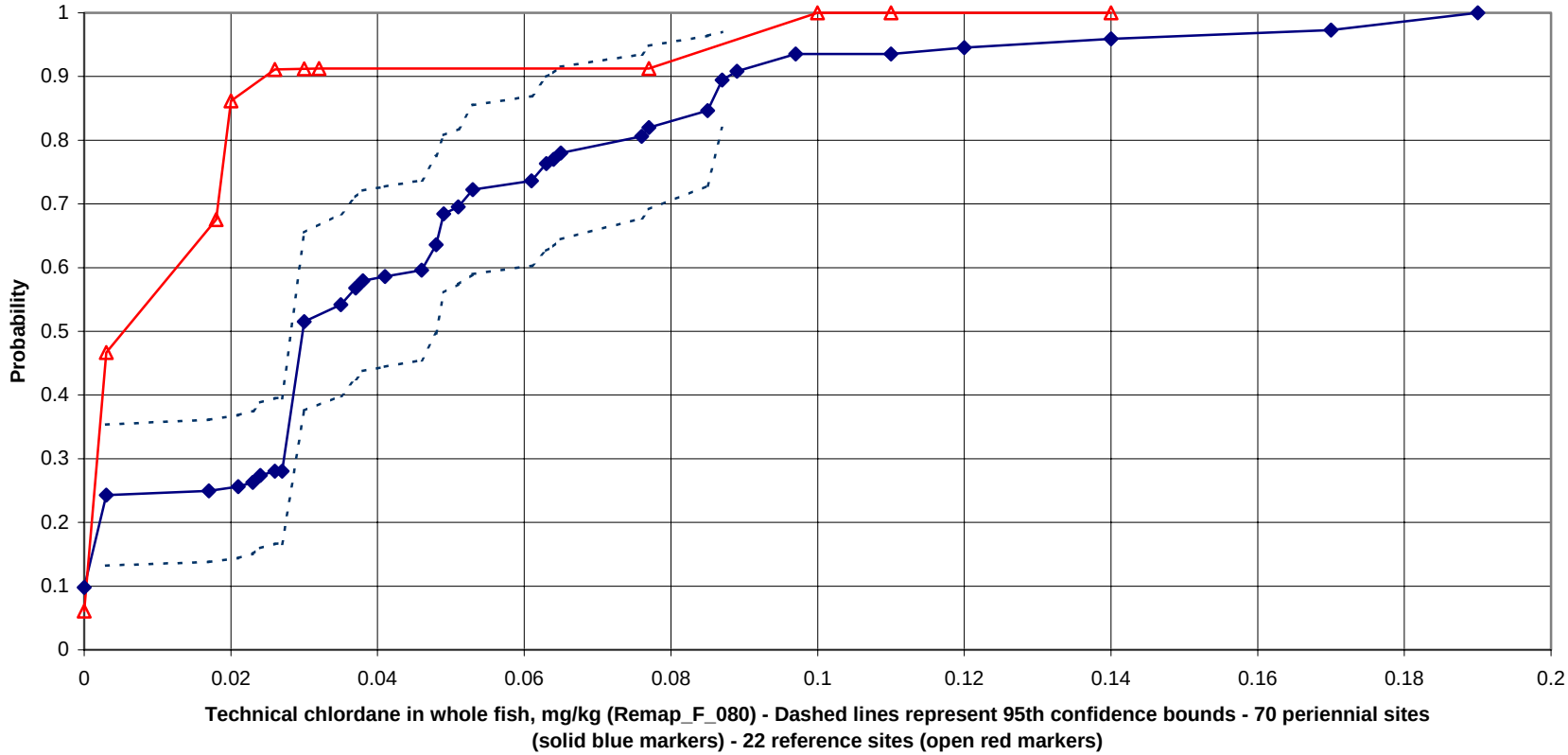


Figure 10. Distribution Of Fish Biotic Index (IBI) By Ecoregion, Perennial (p) Streams, And Reference (r) Streams For 1997-2001 R-EMAP

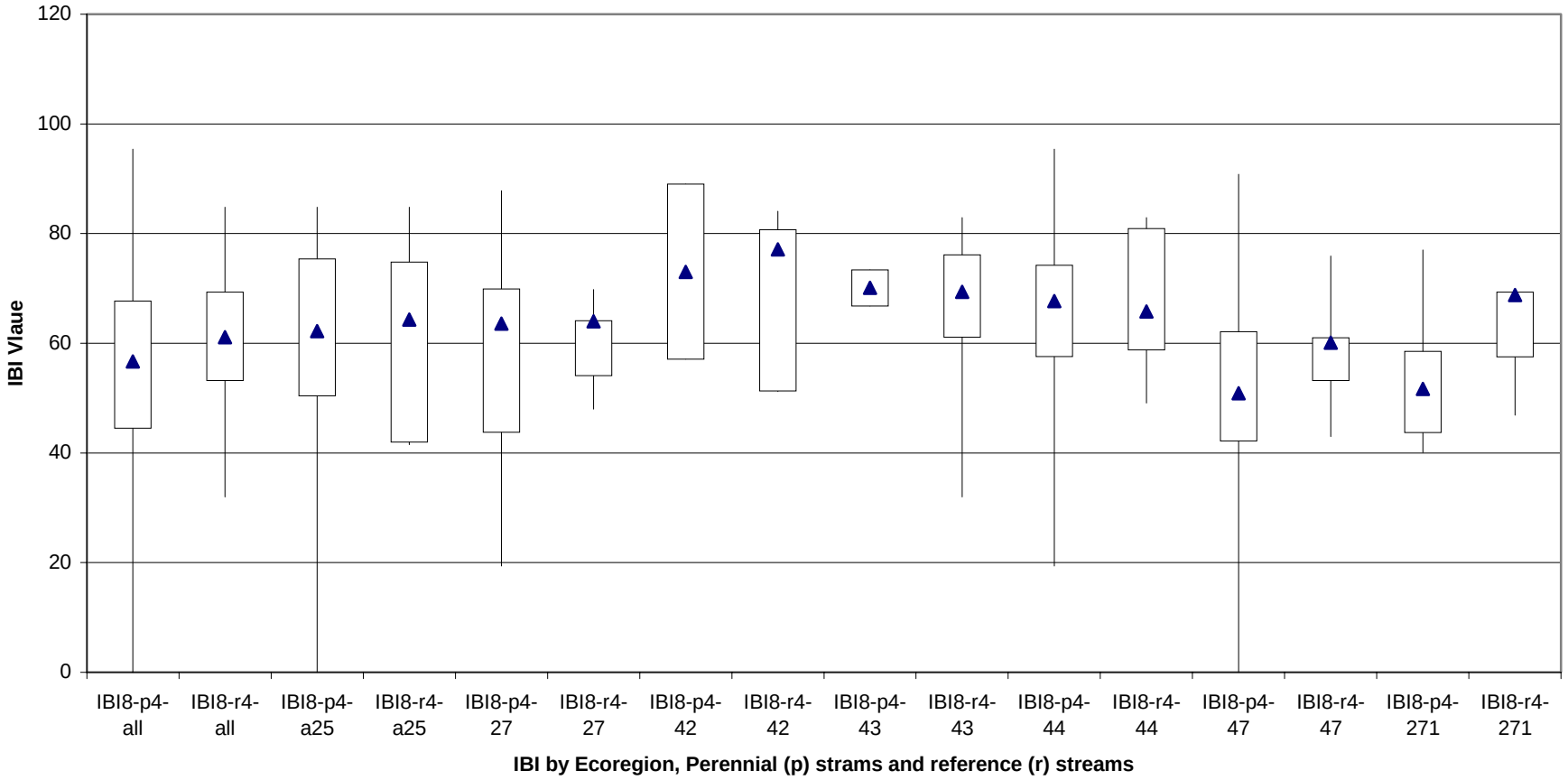


Figure 11. CDF Of Fish IBI8 Scores For All Nebraska Streams, 1997-2001 REMAP

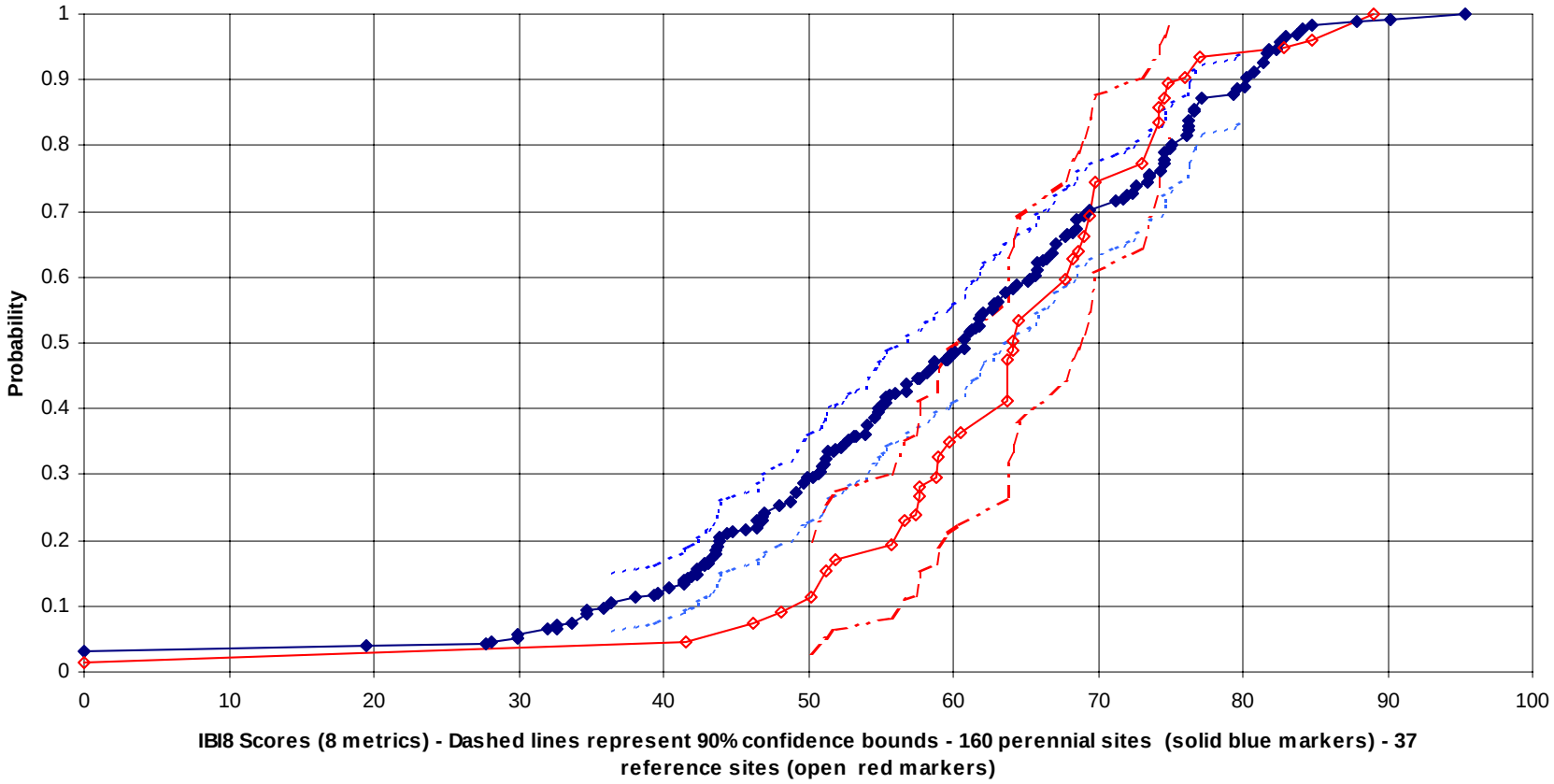


Figure 12. Distribution Of Invertebrate Community Index Scores (ICI) By Ecoregion, Perennial (p) Streams, And Reference (r) Streams For 1997-2001 R-EMAP

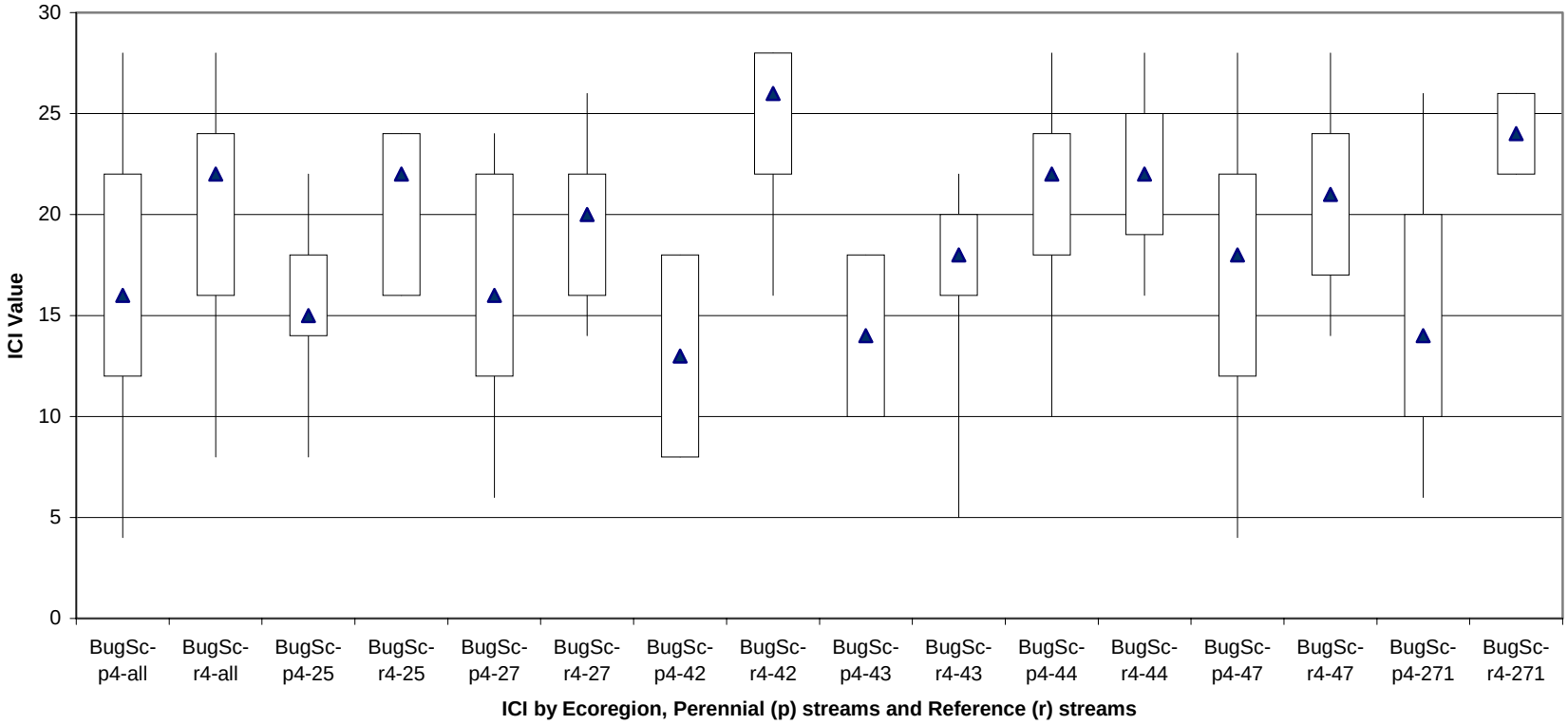


Figure 13. CDF of Macroinvertebrate Community Scores (ICI) For All Nebraska Streams, 1997-2001 R-EMAP

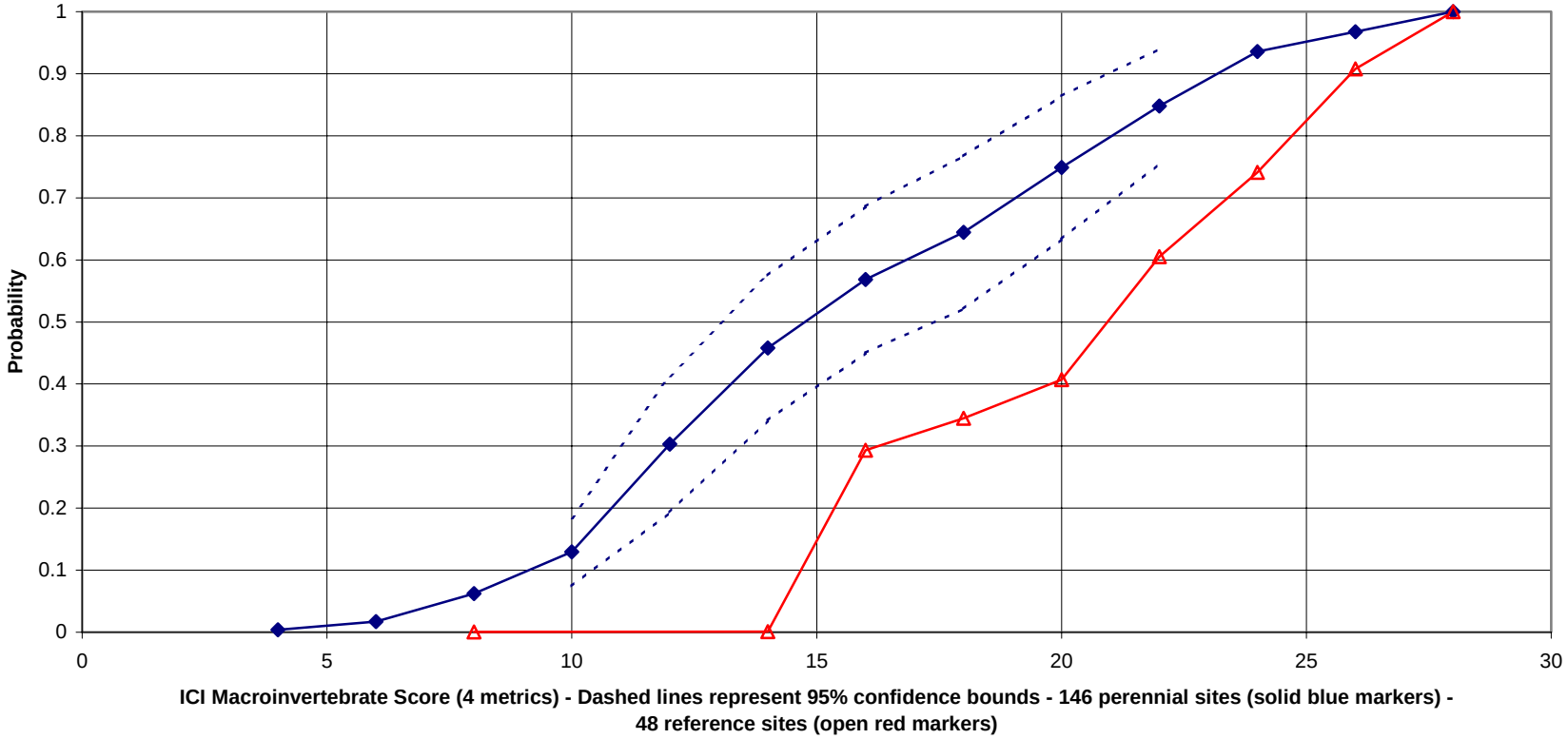


Figure 14. CDF of EPT Taxa Richness For Macroinvertebrates For All Nebraska Streams, 1997-2001 R-EMAP

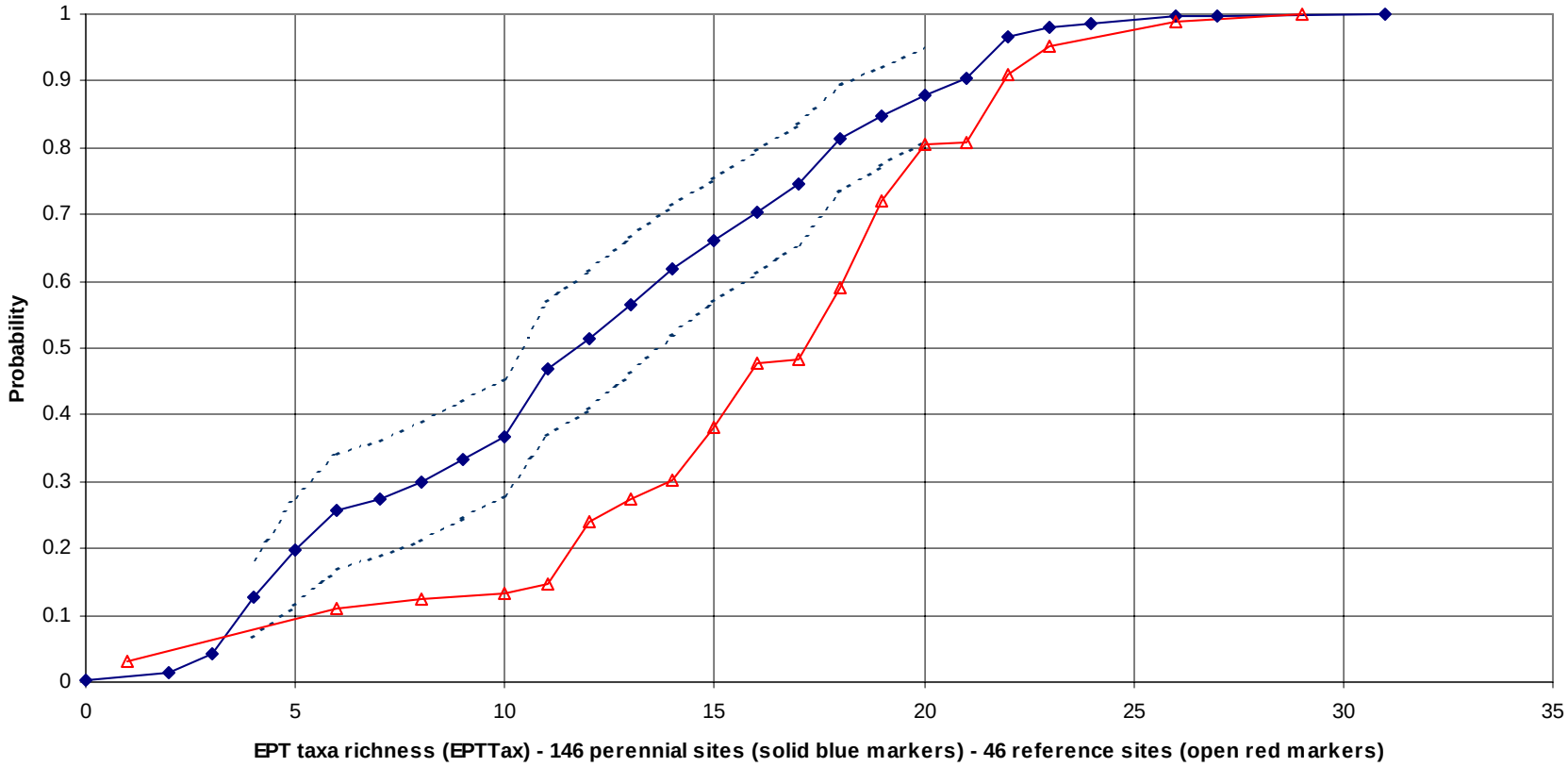


Figure 15. Box Plots Of The Distribution Of The Nebraska Habitat Index Scores For All Ecoregions, Perennial Streams, And Reference Streams For The 1997-2001 R-EMAP

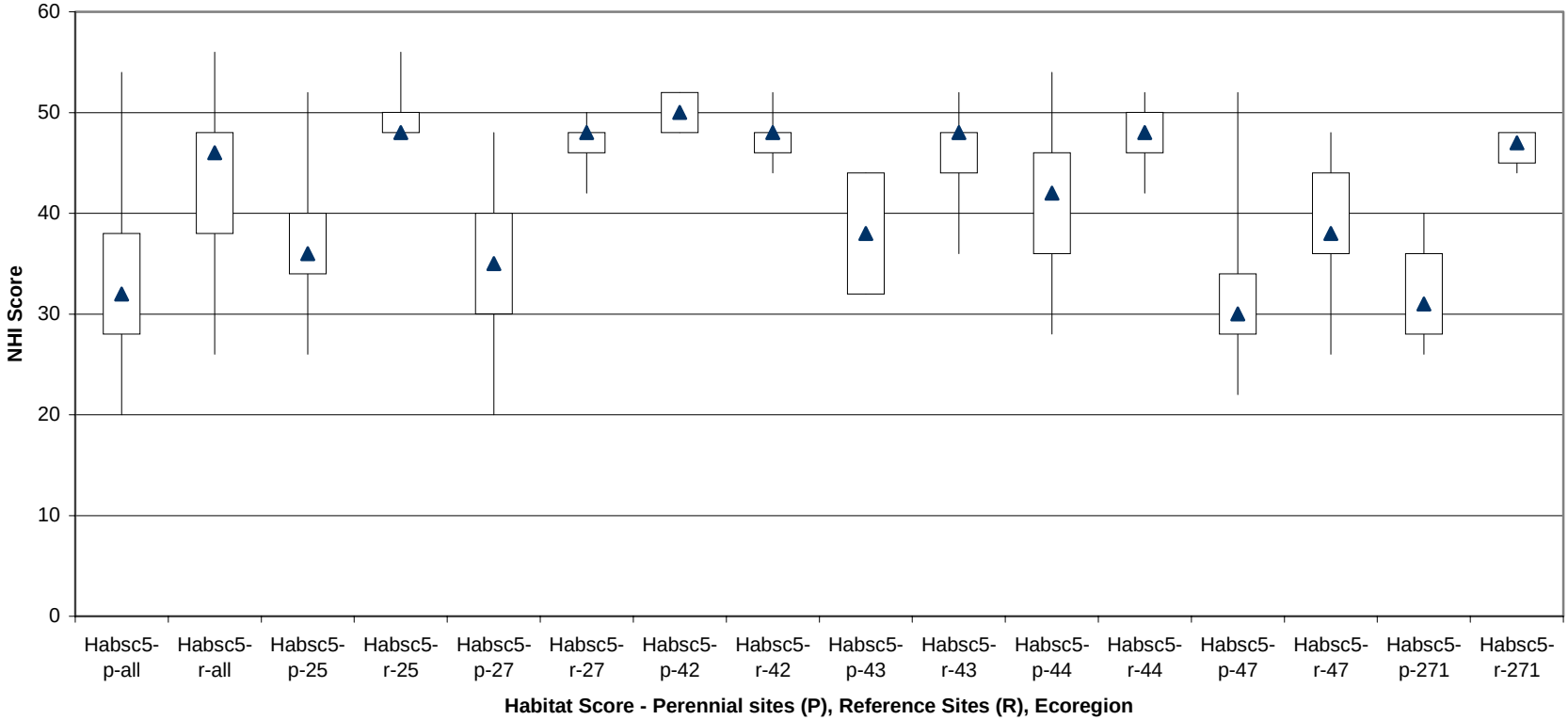


Figure 16. CDF Of The Habitat Scores (HBI) For All Nebraska Streams, 1997-2001 R-EMAP

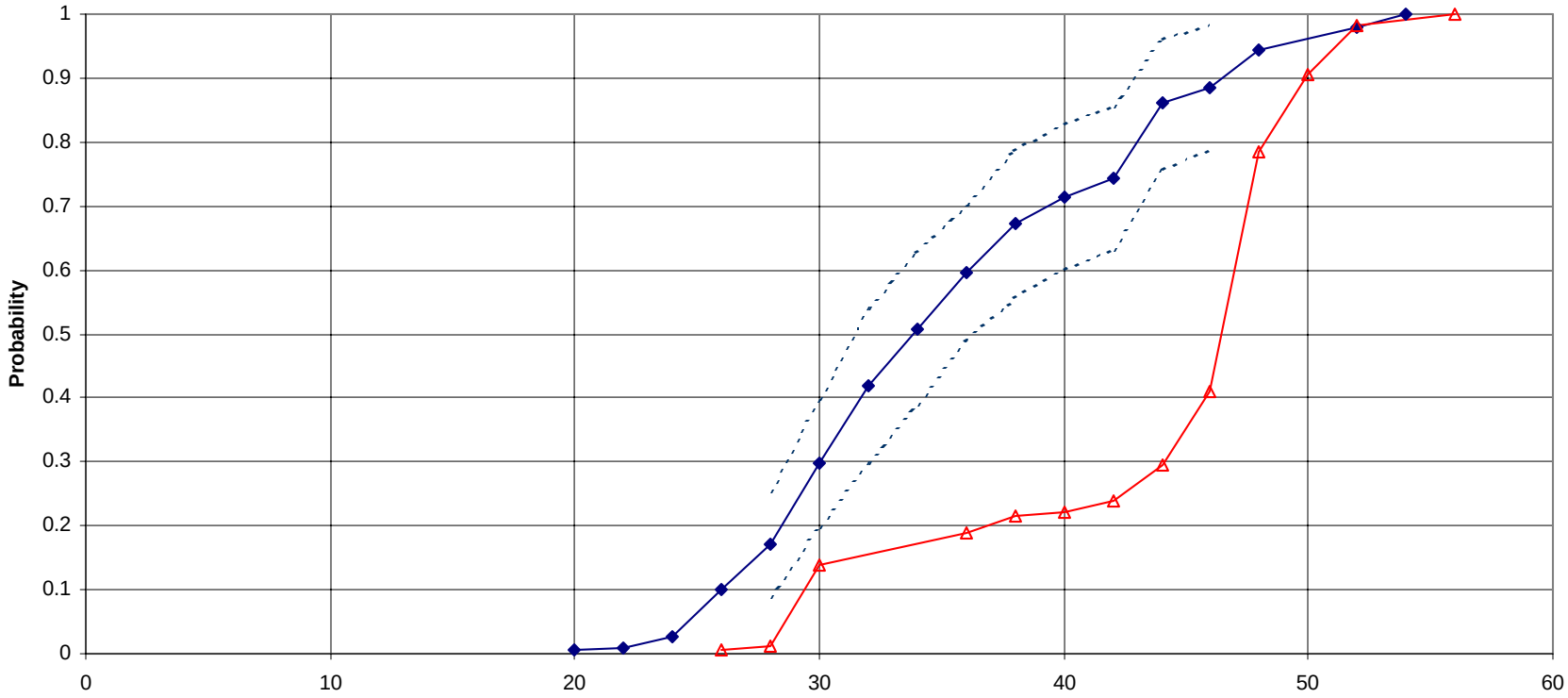


Figure 17. CDF of Temperature In Nebraska Streams, 1997-2001 REMAP

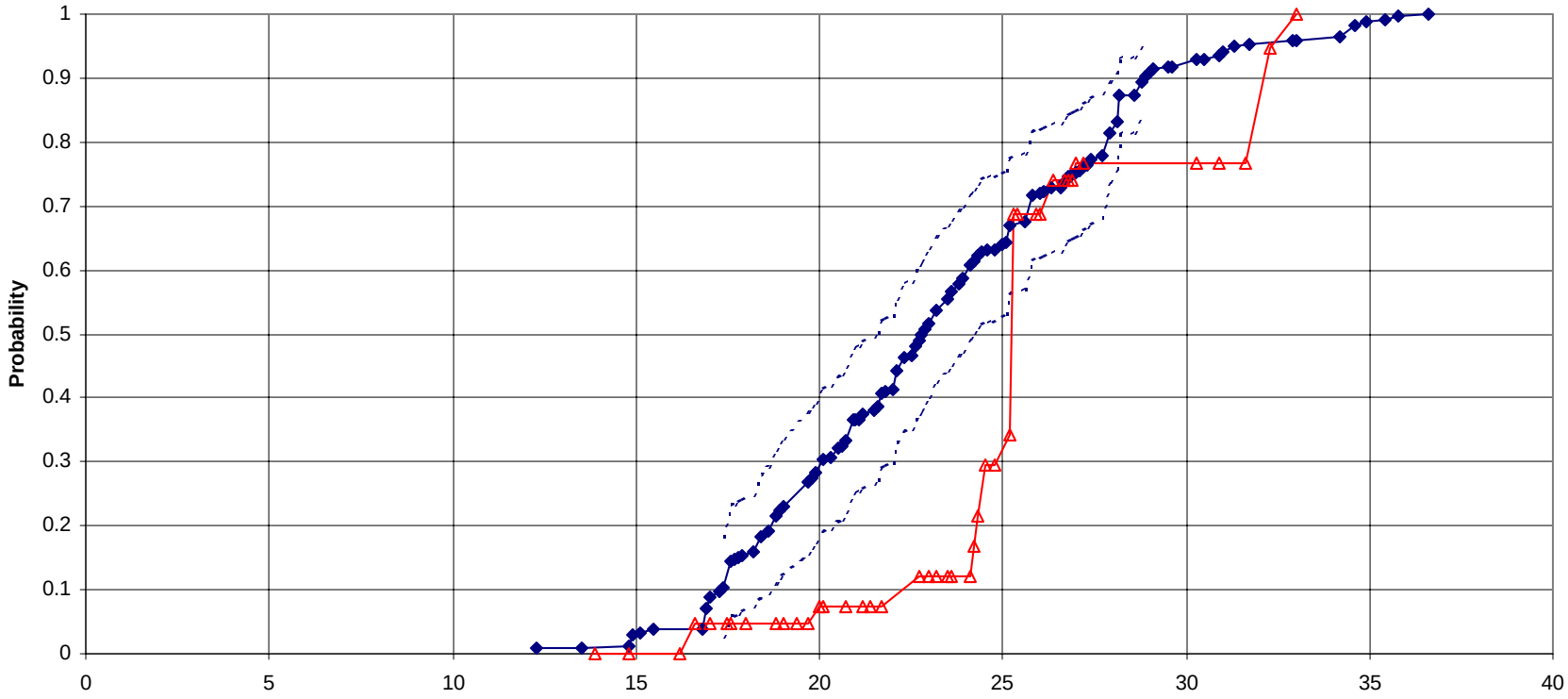


Figure 18. Temperatures In Nebraska Coldwater Perennial Streams. 1997-2001 R-EMAP

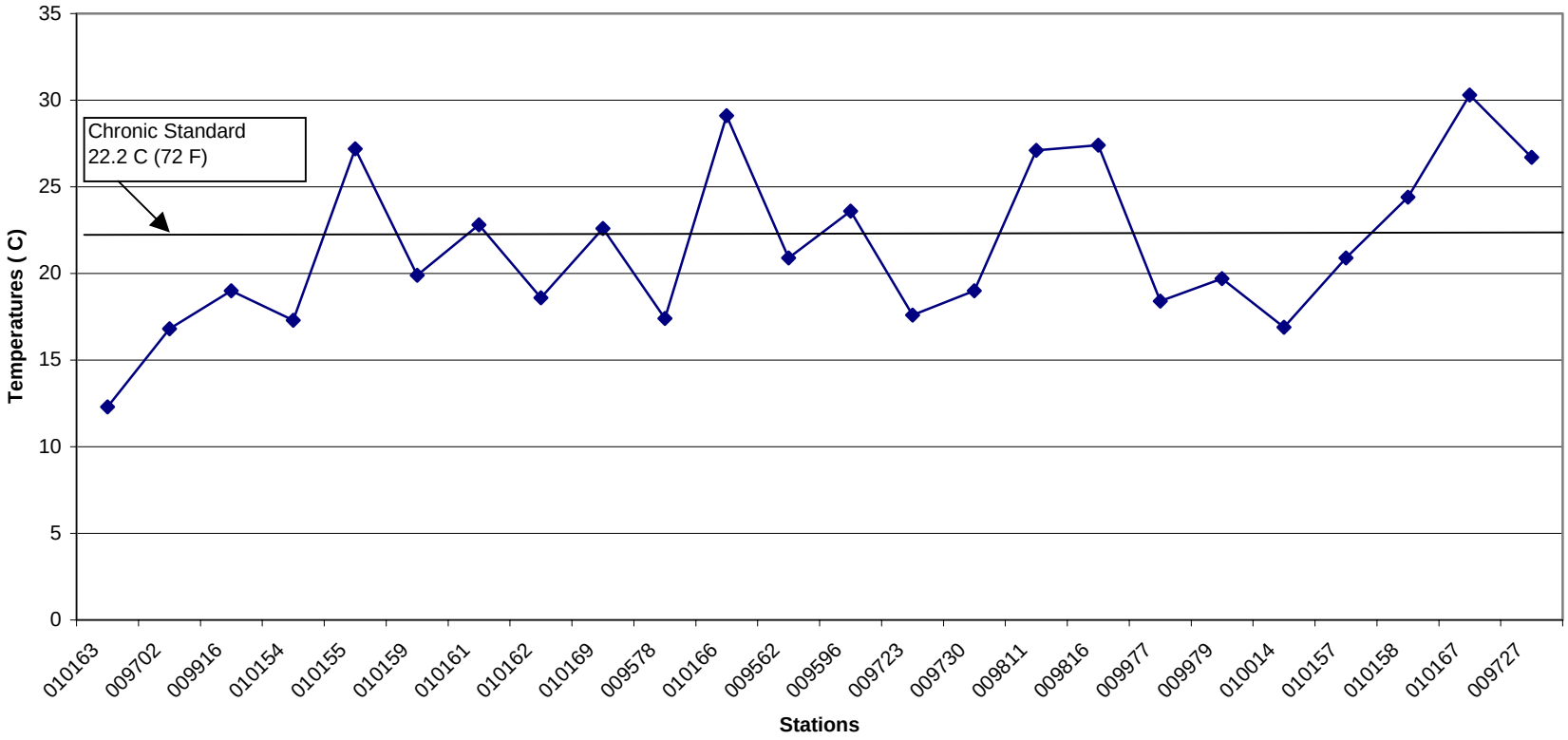
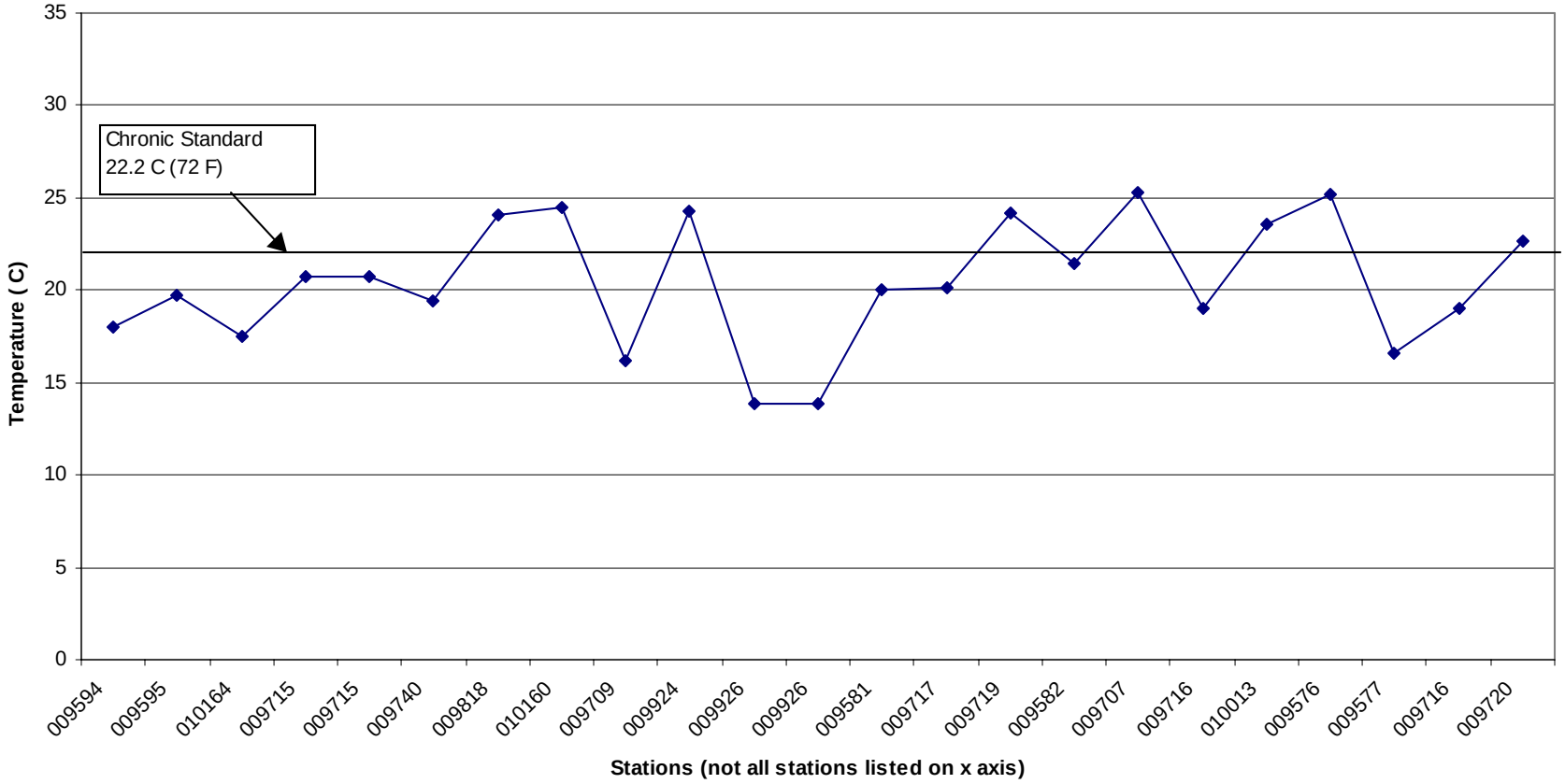


Figure 19. Temperatures In Nebraska Coldwater Reference Streams, 1997-2001 R-EMAP



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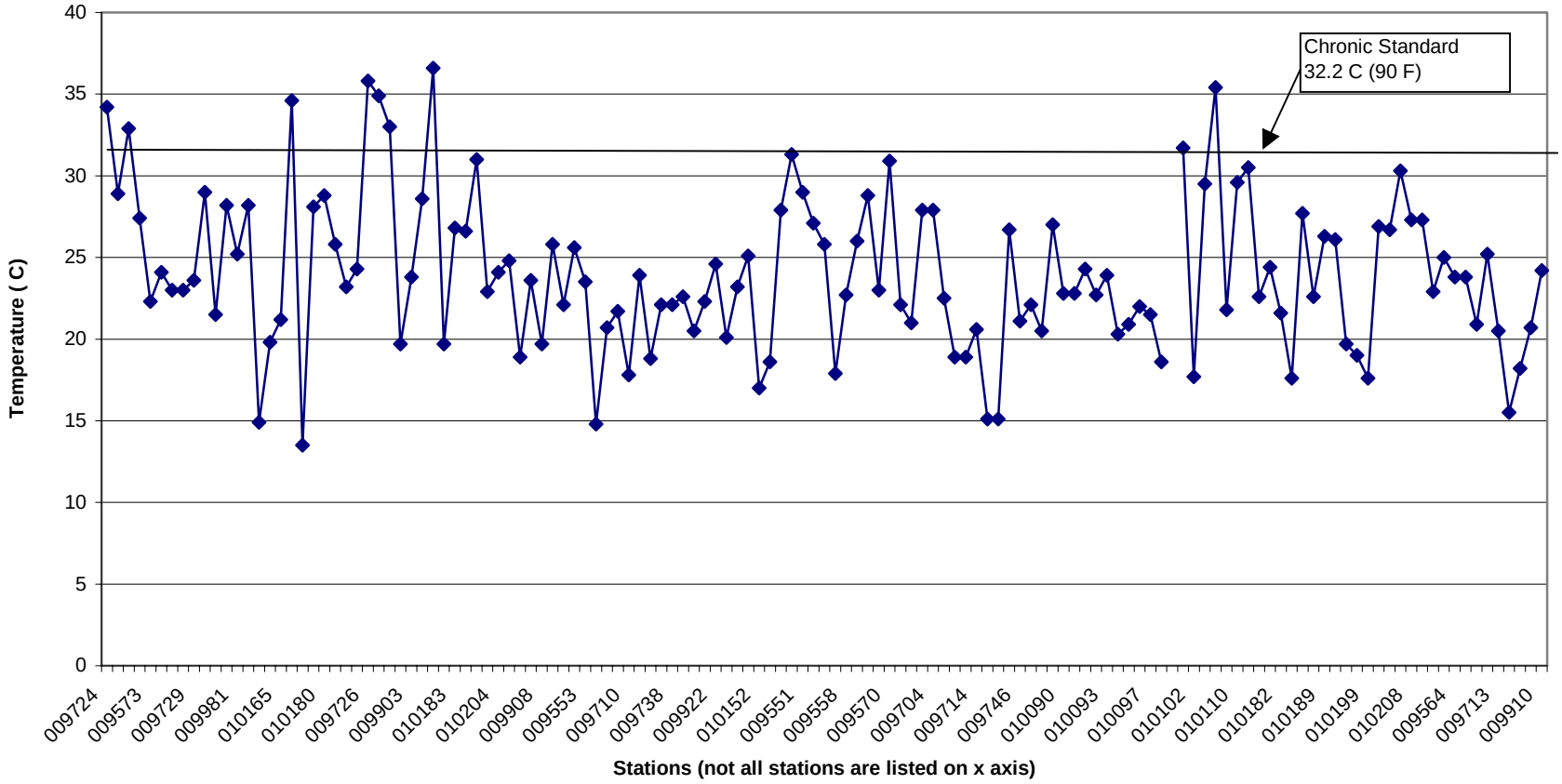


Figure 21. Temperatures In Nebraska Warmwater Reference Streams, 1997-2001 R-EMAP

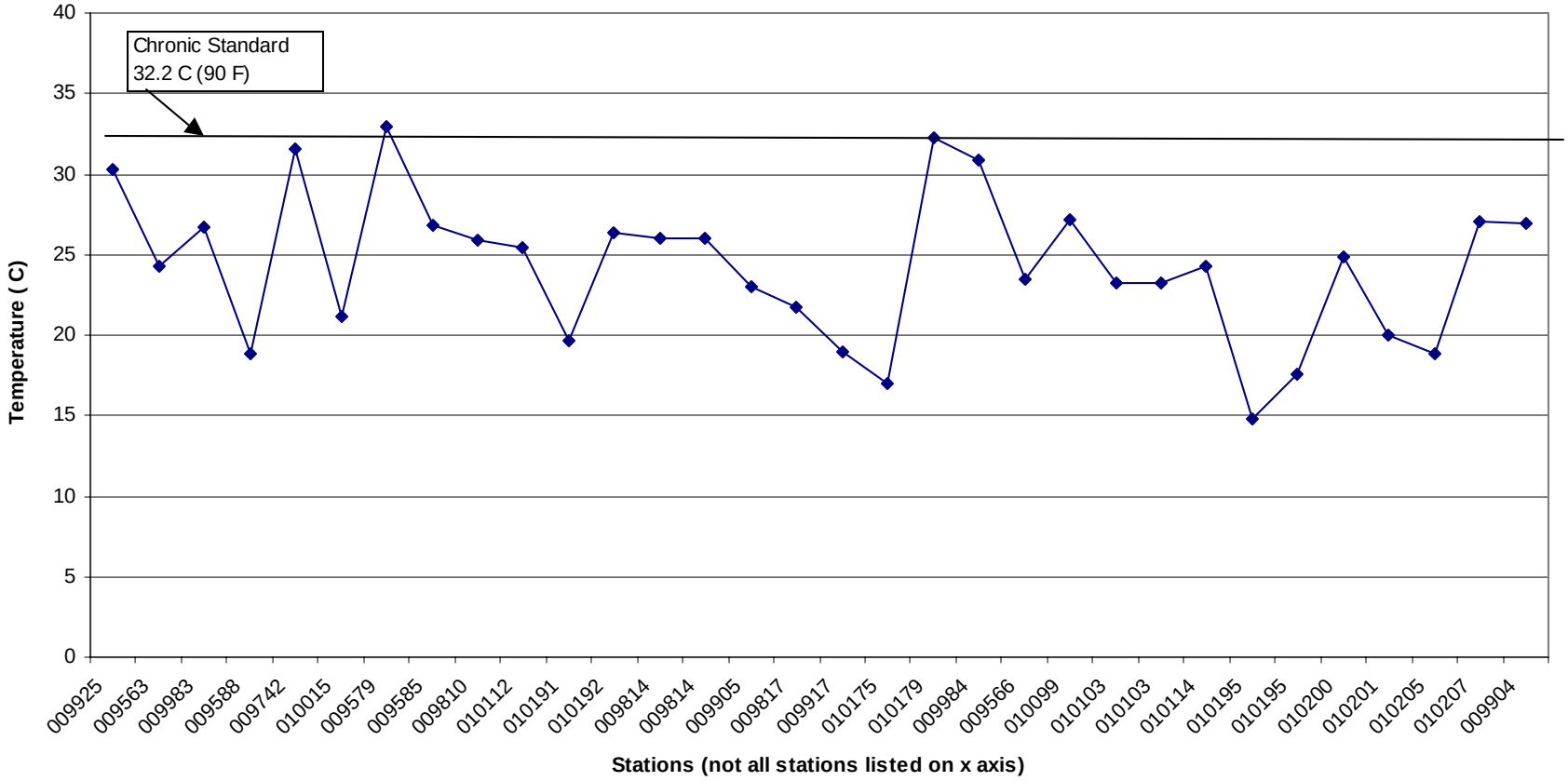


Figure 22. Dissolved Oxygen In Nebraska Coldwater Perennial Streams, 1997-2001 R-EMAP

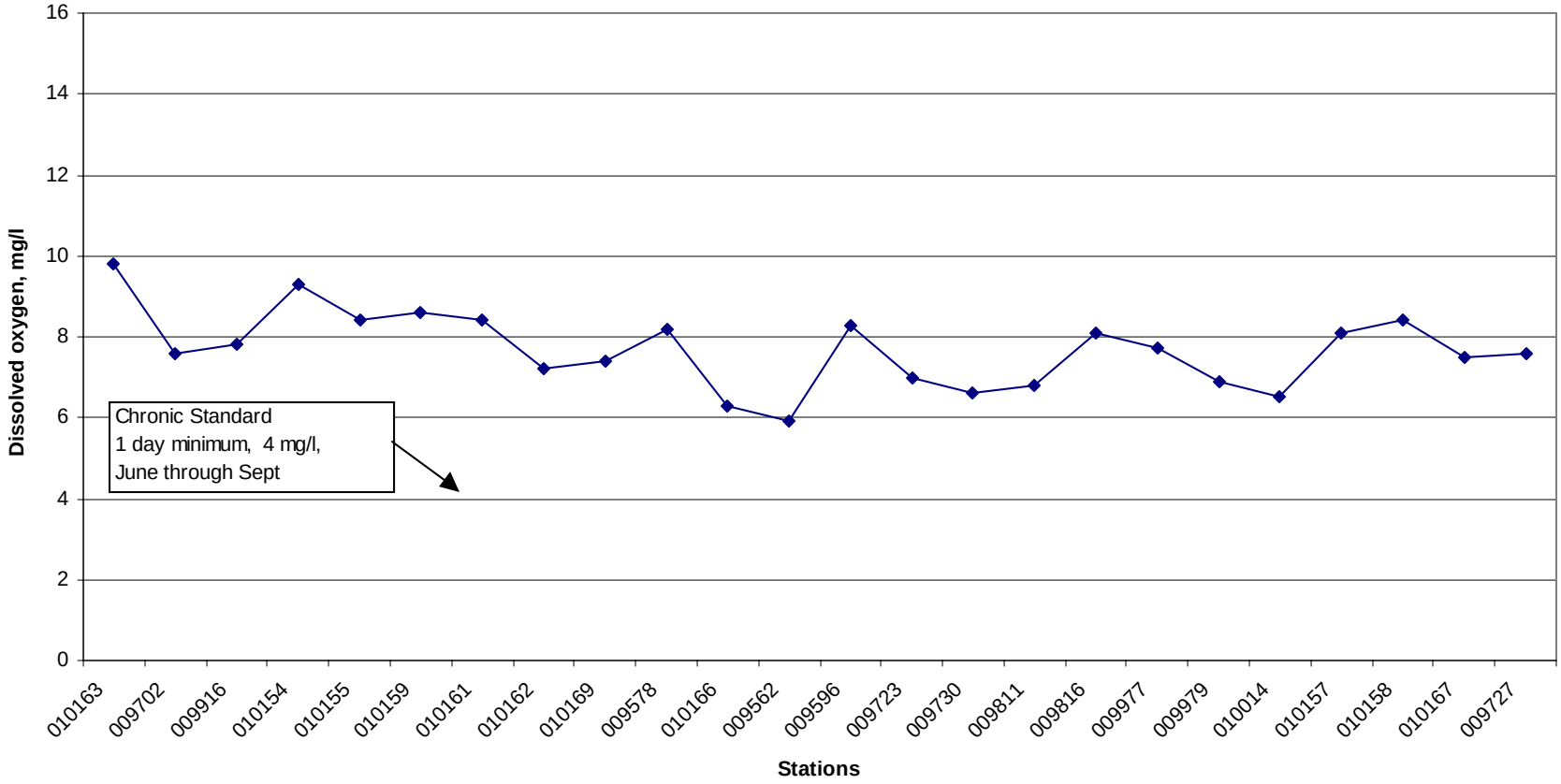


Figure 23. Dissolved Oxygen In Nebraska Coldwater Reference Streams, 1997-2001 R-EMAP

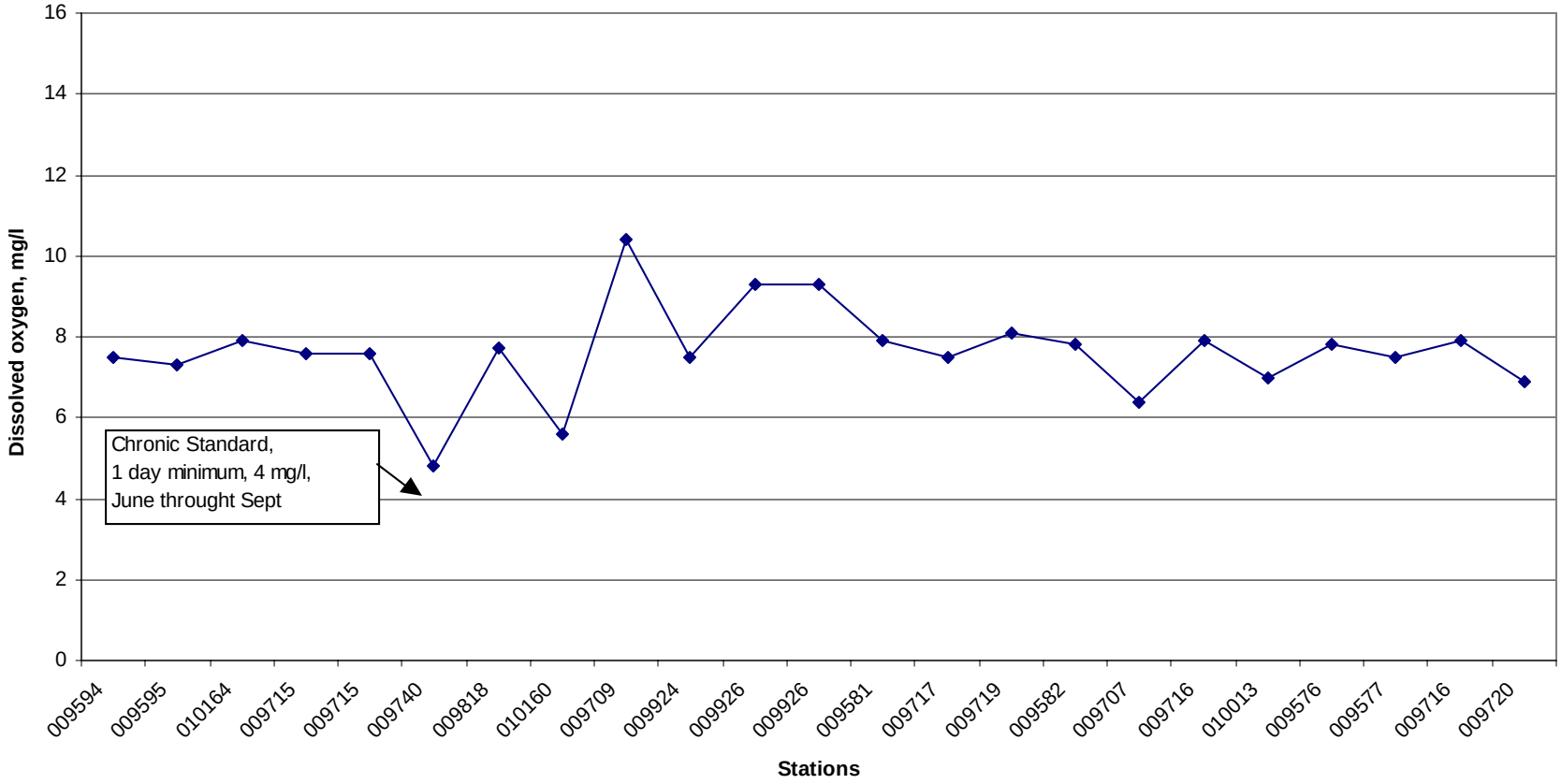


Figure 24. Dissolved Oxygen In Nebraska Warmwater Perennial Streams, 1997-2001 R-EMAP

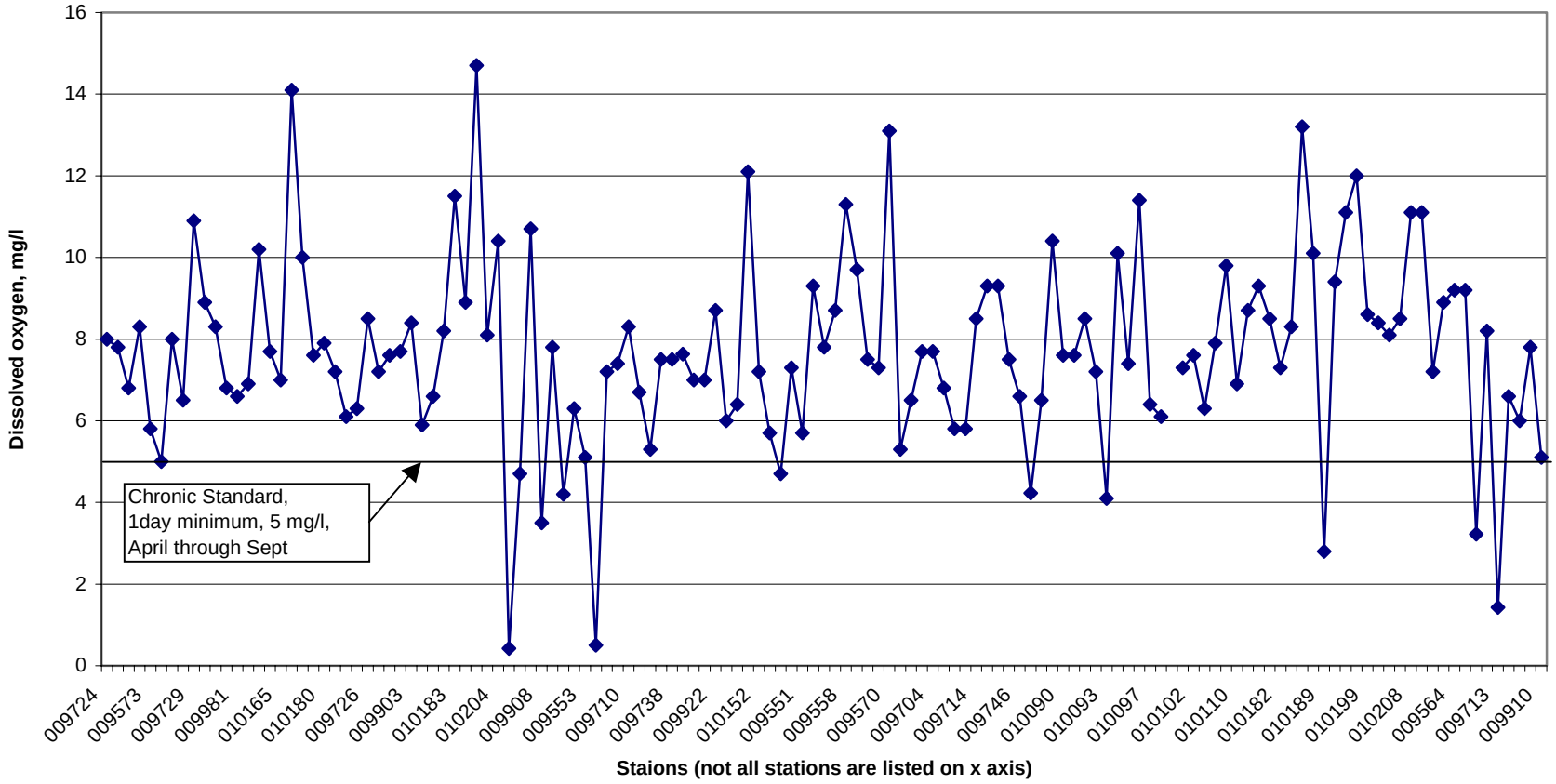


Figure 25. Dissolved Oxygen In Nebraska Warmwater Reference Streams, 1997-2001 R-EMAP

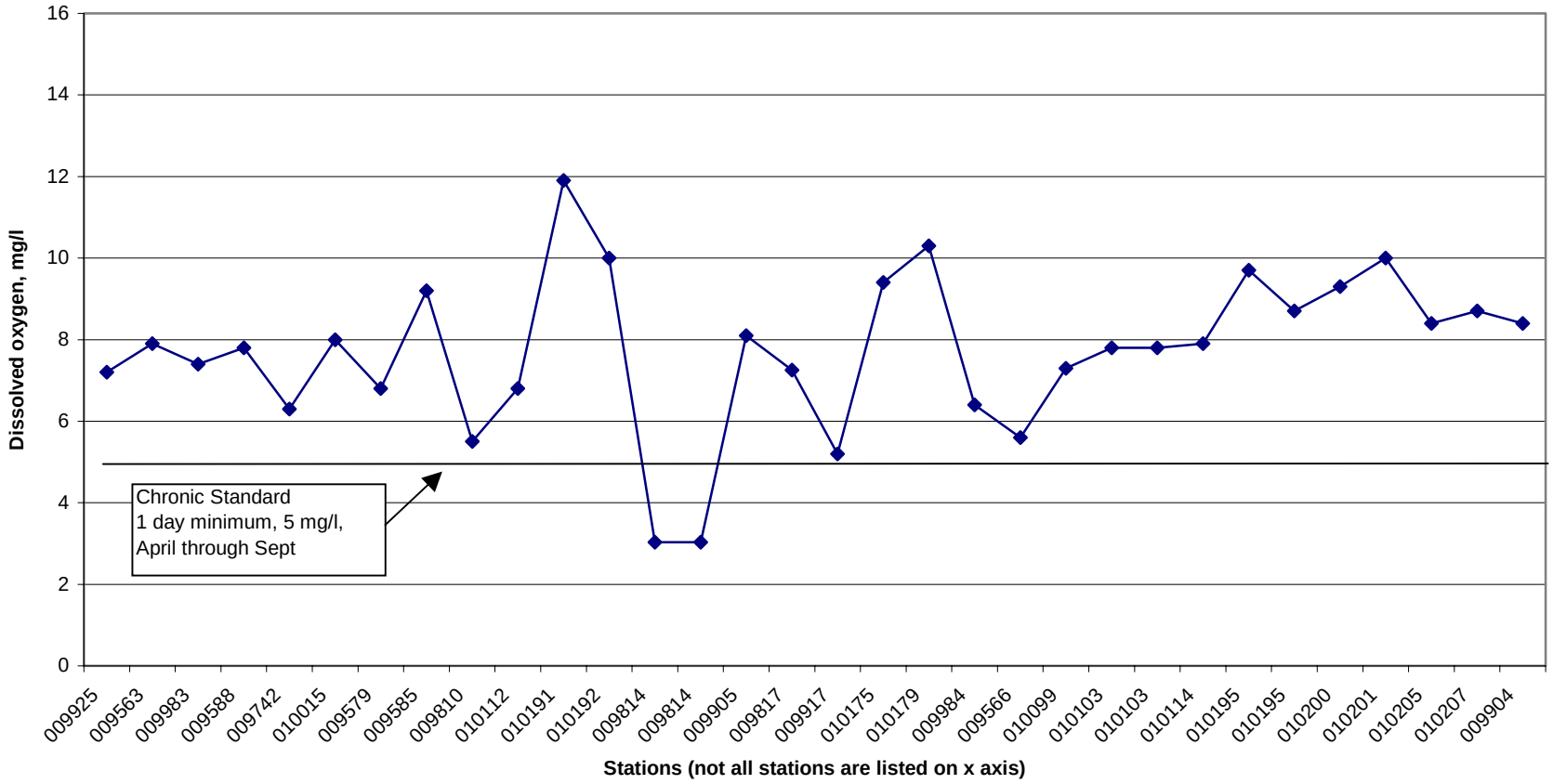
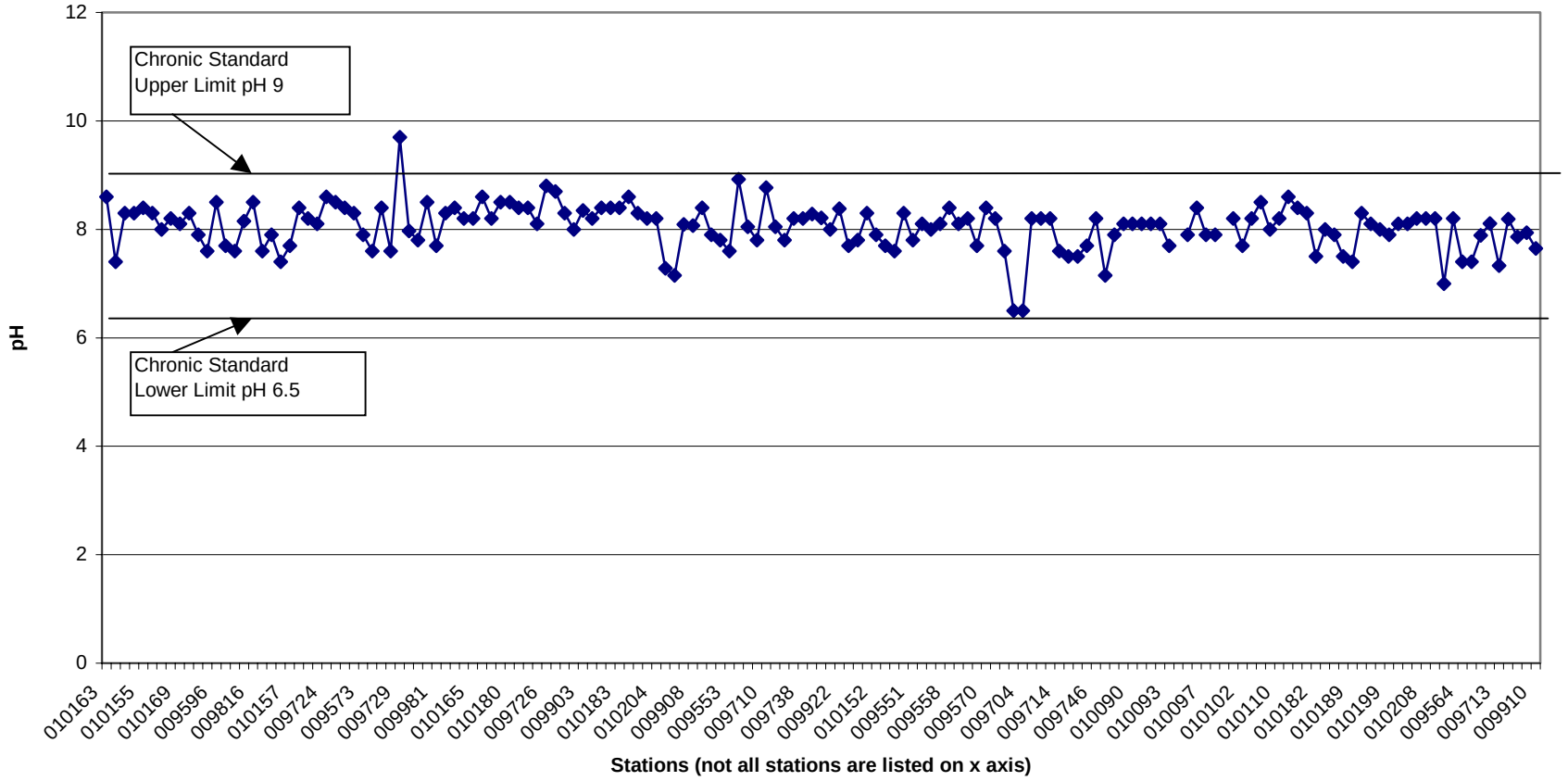


Figure 26. pH In Nebraska Perennial Streams, 1997-2001 R-EMAP



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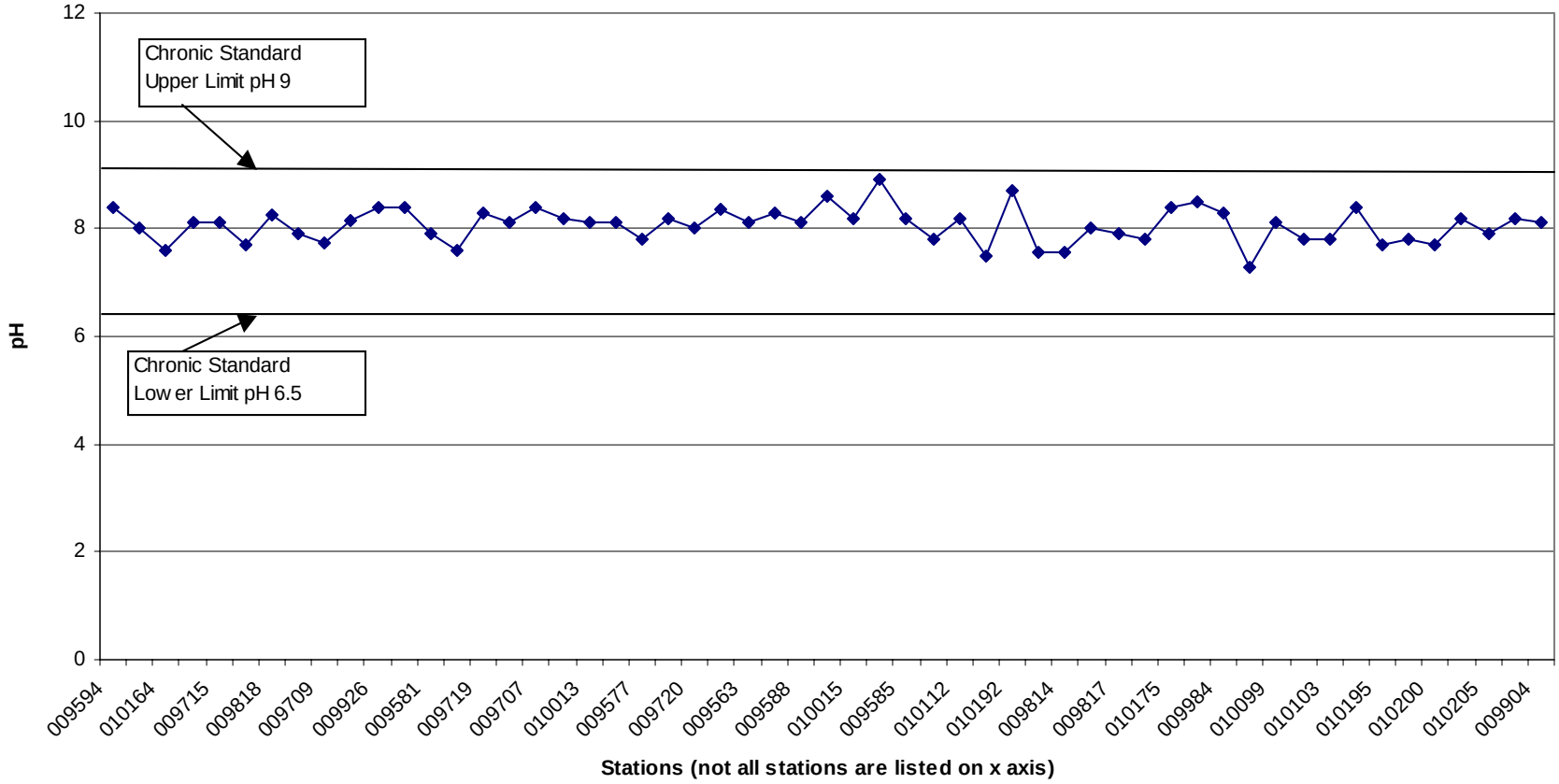


Figure 28. Phosphorus In Nebraska Perennial Streams, 1997-2001 R-EMAP

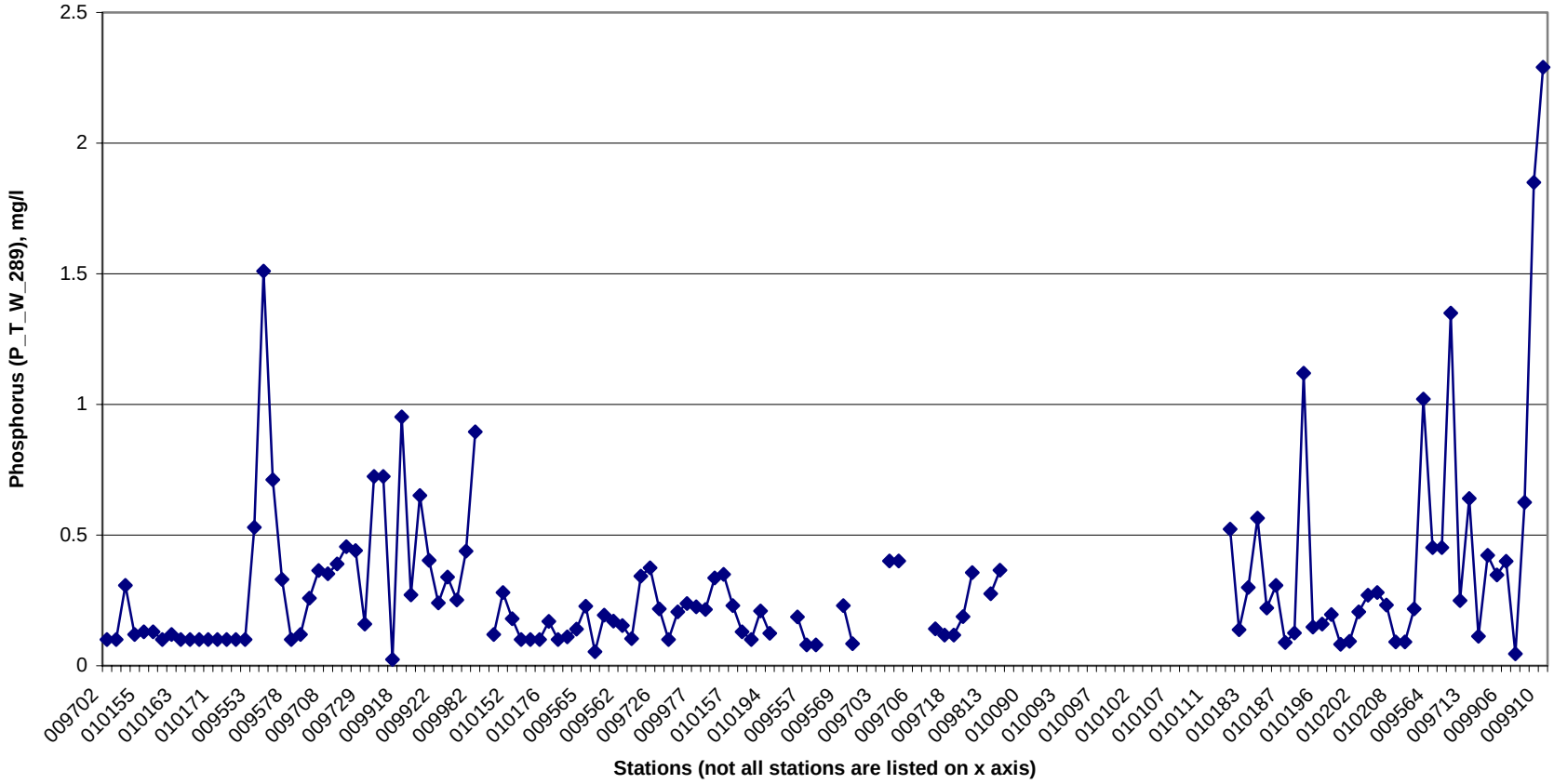


Figure 29. Phosphorus In Nebraska Reference Streams, 1997-2001 R-EMAP

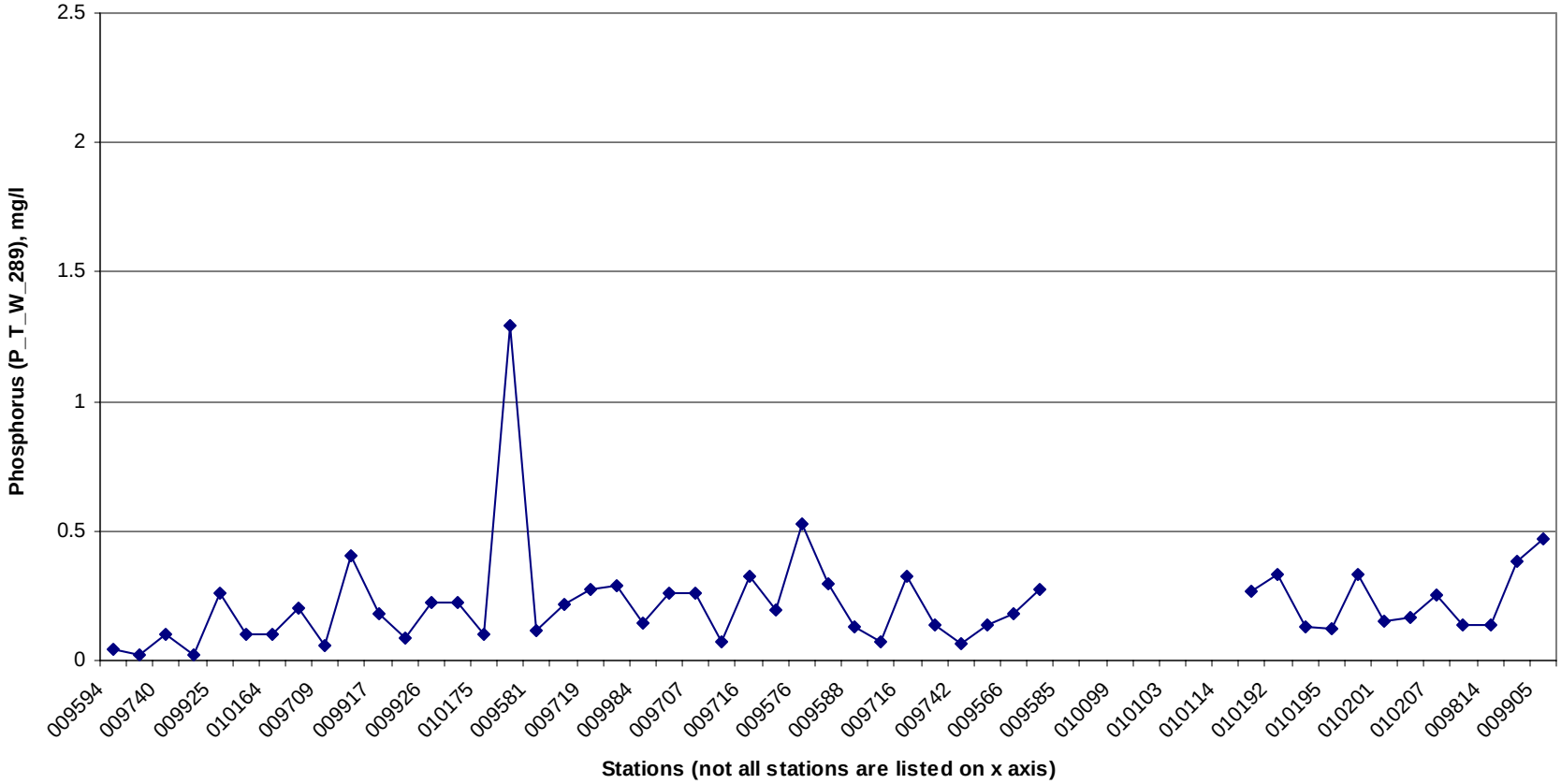


Figure 30. Nitrogen, Calculated Total, In Nebraska Perennial Streams, 1997-2001 R-EMAP

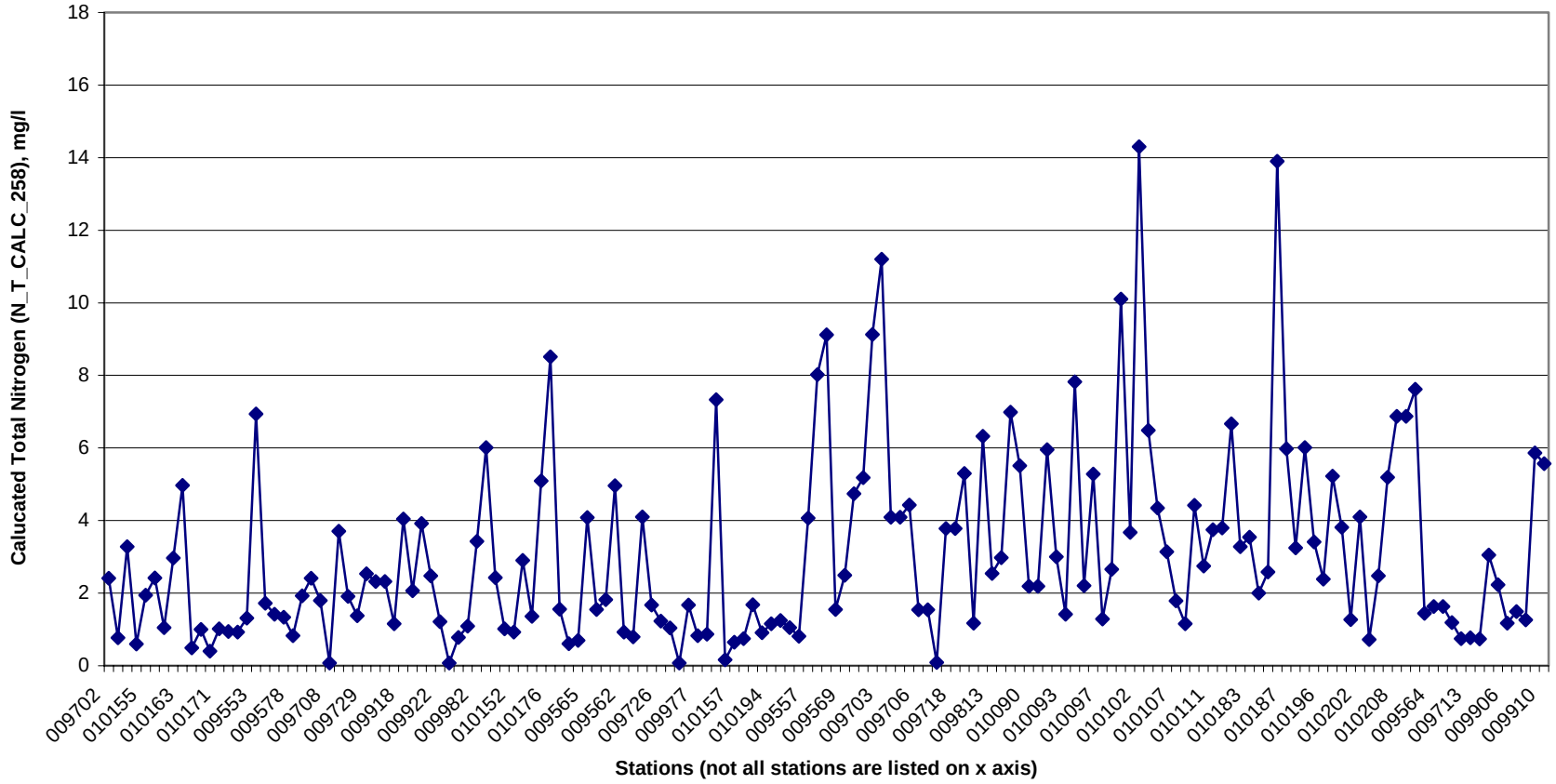


Figure 31. Nitrogen, Calculated Total, In Nebraska Reference Streams, 1997-2001 R-EMAP

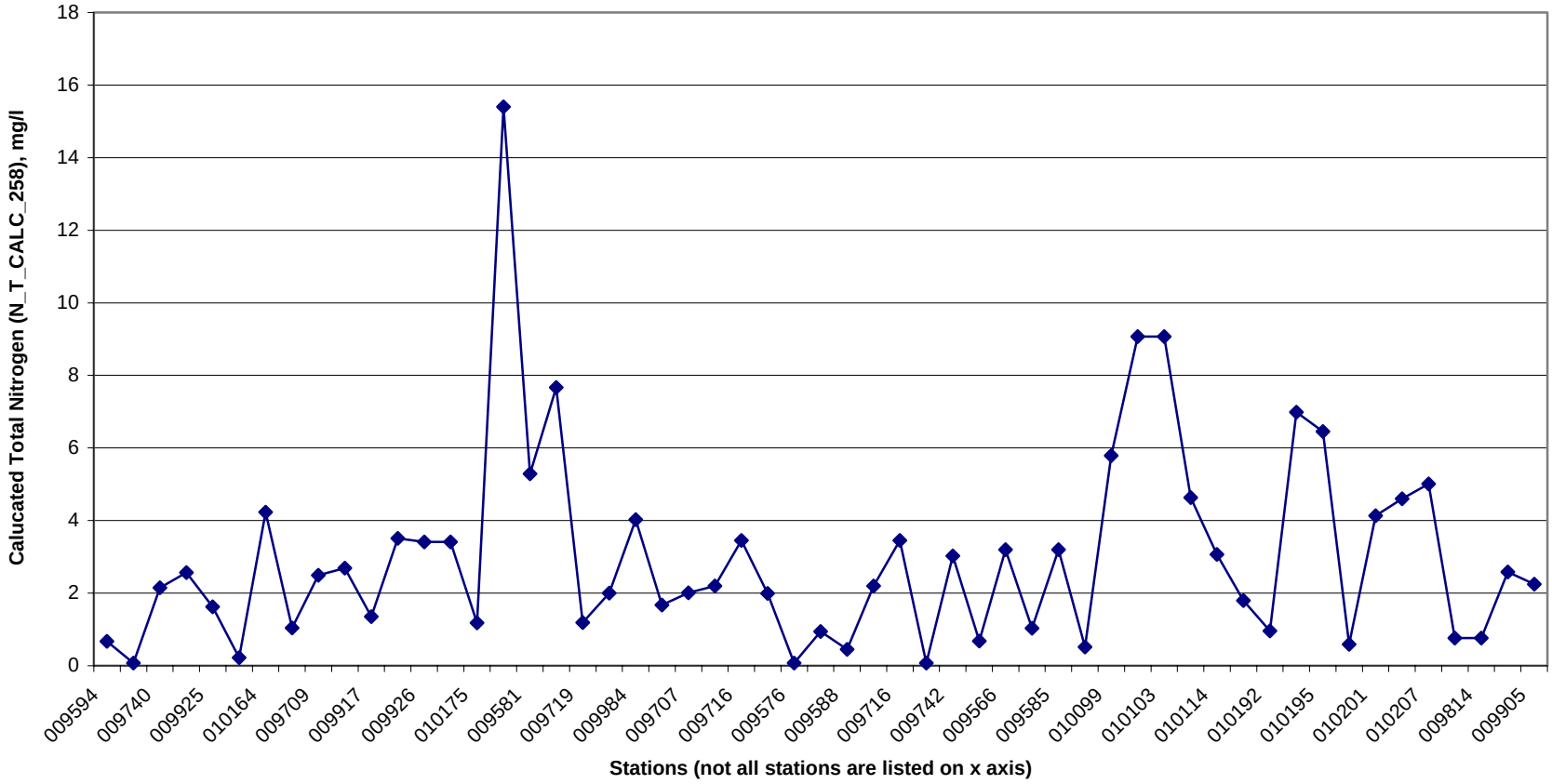


Figure 32. Nitrogen, Calculated Organic, In Nebraska Perennial Streams, 1997-2001 R-EMAP

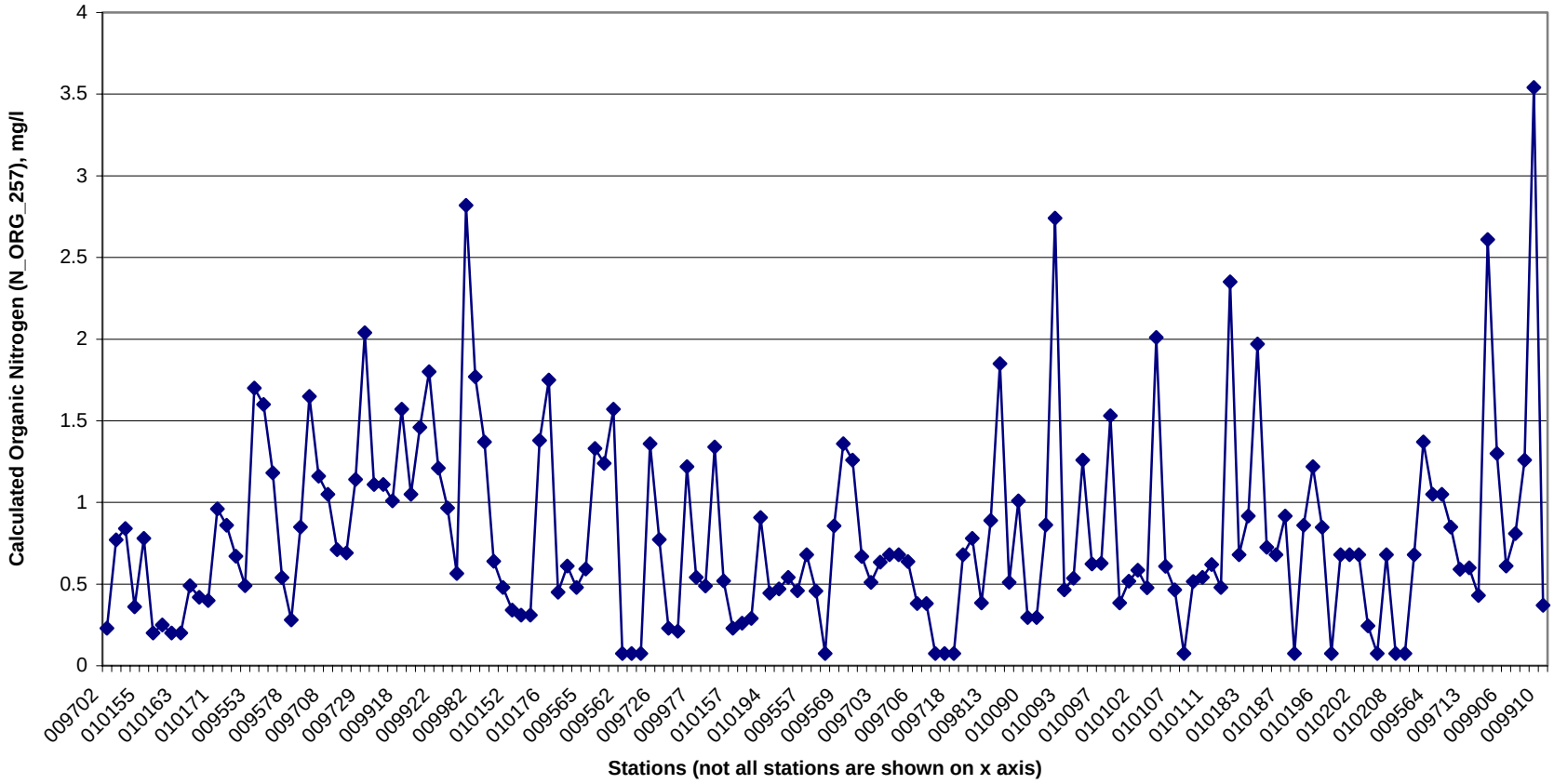


Figure 33. Nitrogen, Calculated Organic, In Nebraska Reference Streams, 1997-2001 R-EMAP

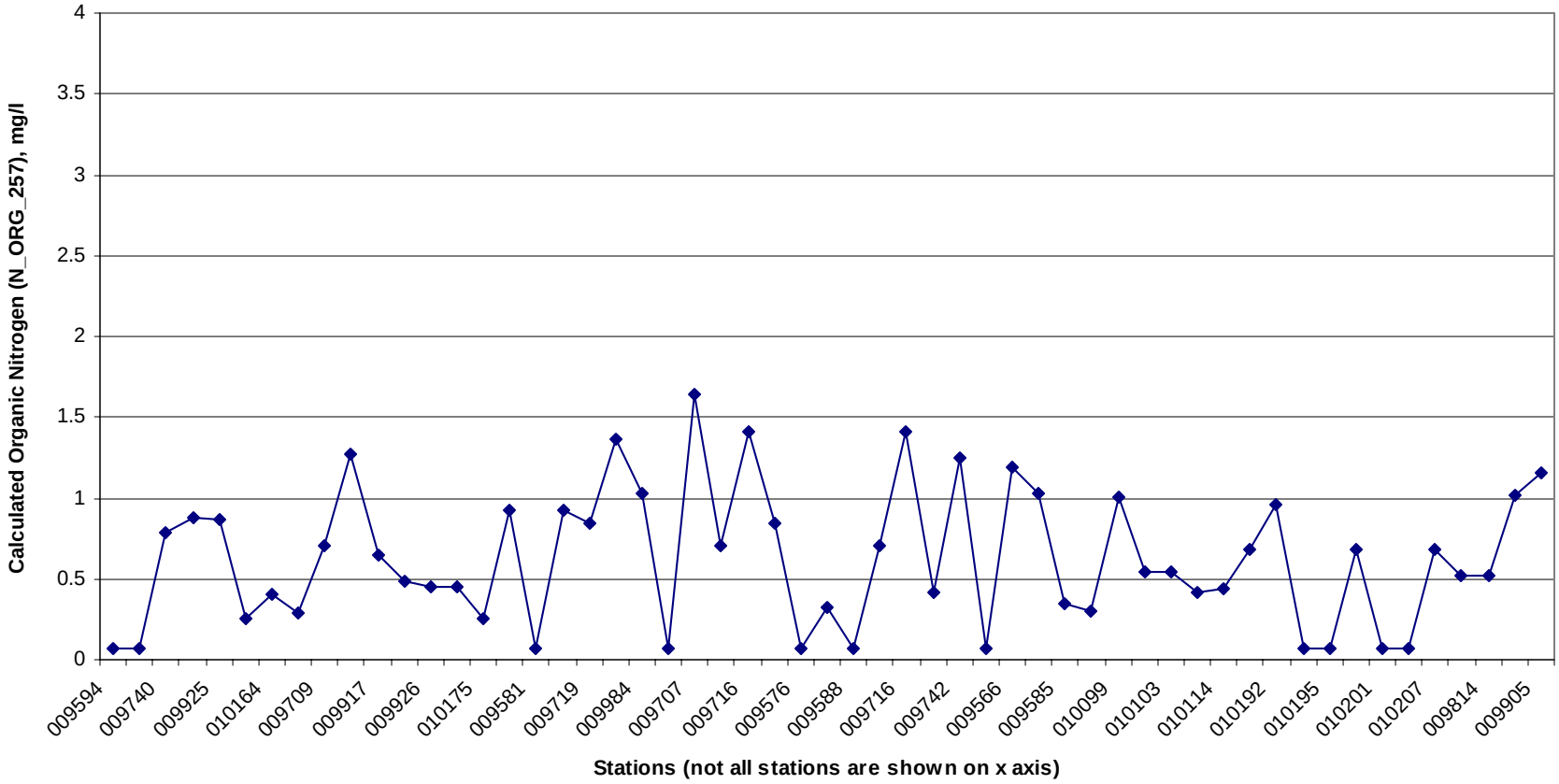


Figure 34. Nitrogen, Nitrate + Nitrite, In Nebraska Perennial Streams, 1997-2001 R-EMAPO

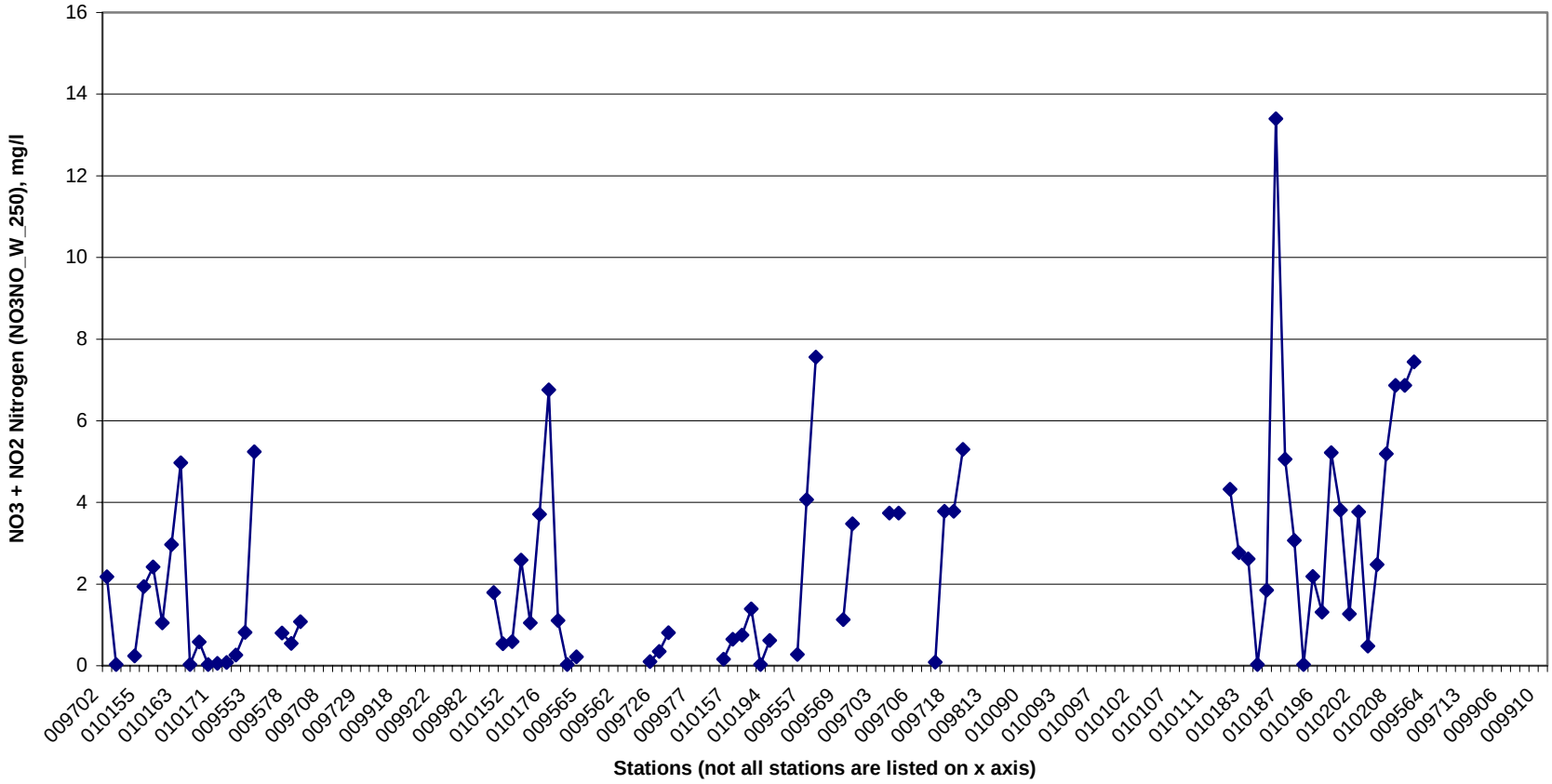


Figure 35. Nitrogen, Nitrate + Nitrite, In Nebraska Reference Streams, 1997-2001 R-EMAP

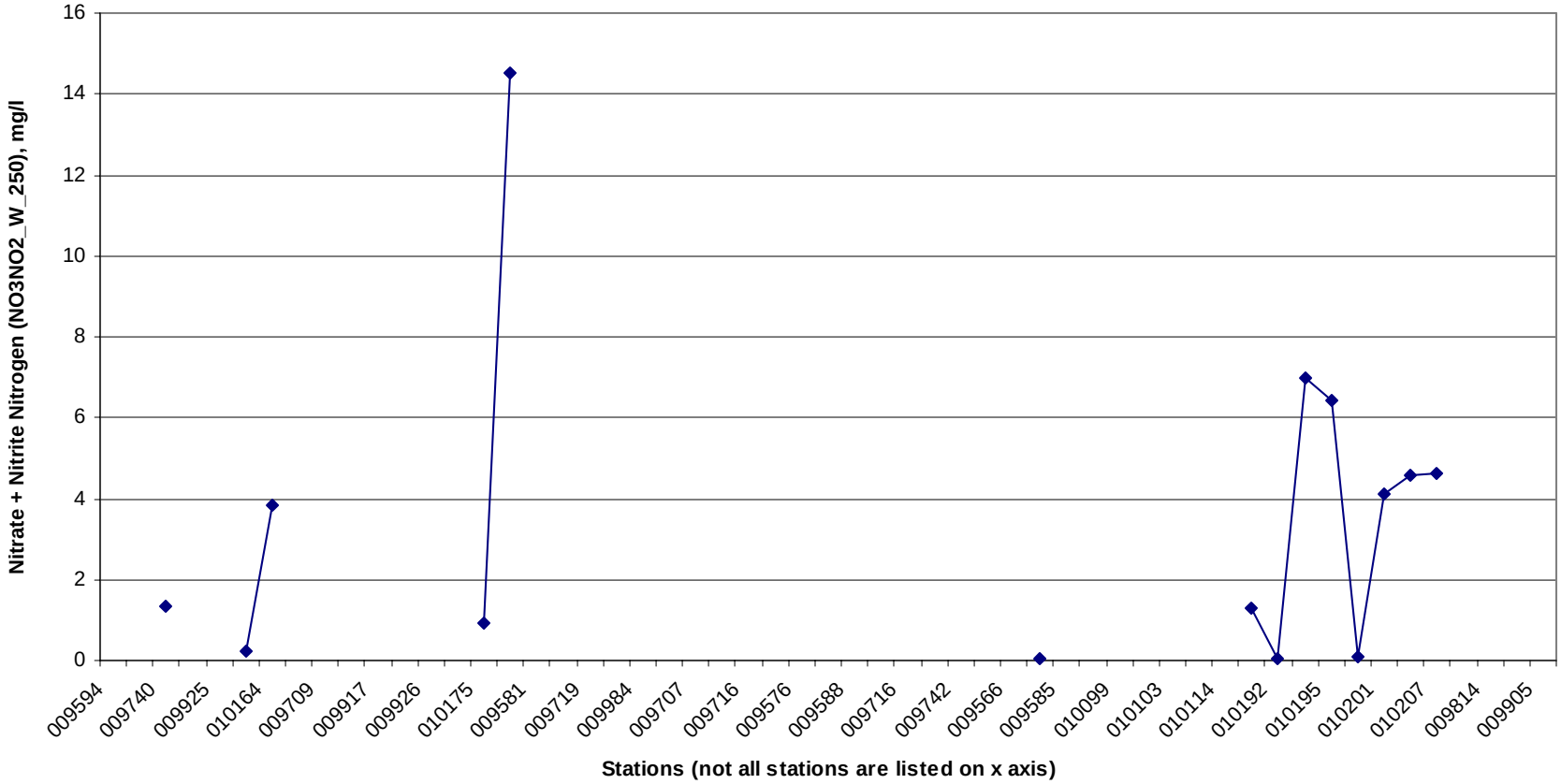


Figure 36. Nitrogen, Total Kjeldhal, In Nebraska Perennial Streams, 1997-2001 R-EMAP

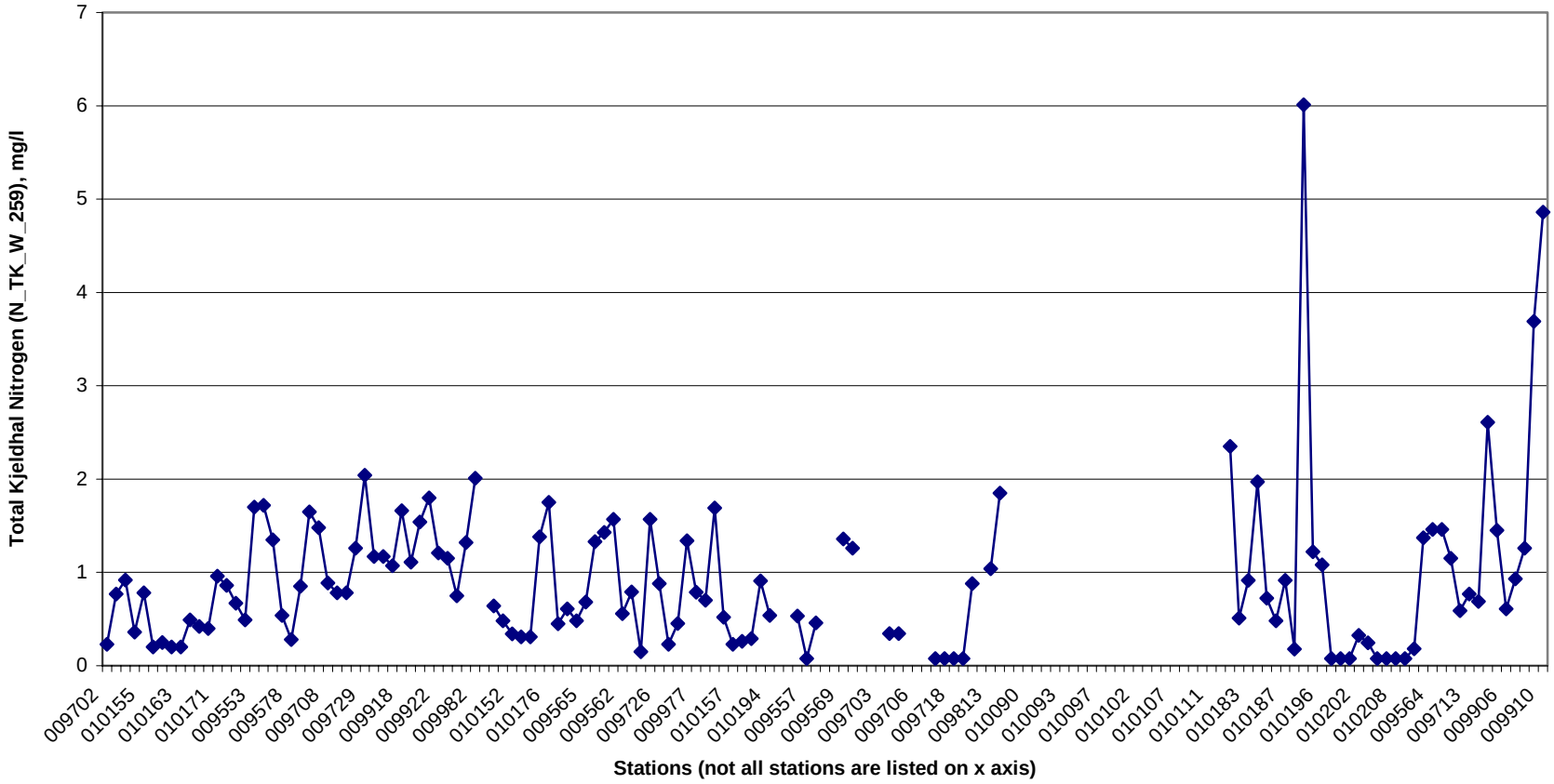


Figure 37. Nitrogen, Total Kjeldhal, In Nebraska Reference Streams, 1997-2001 R-EMAP

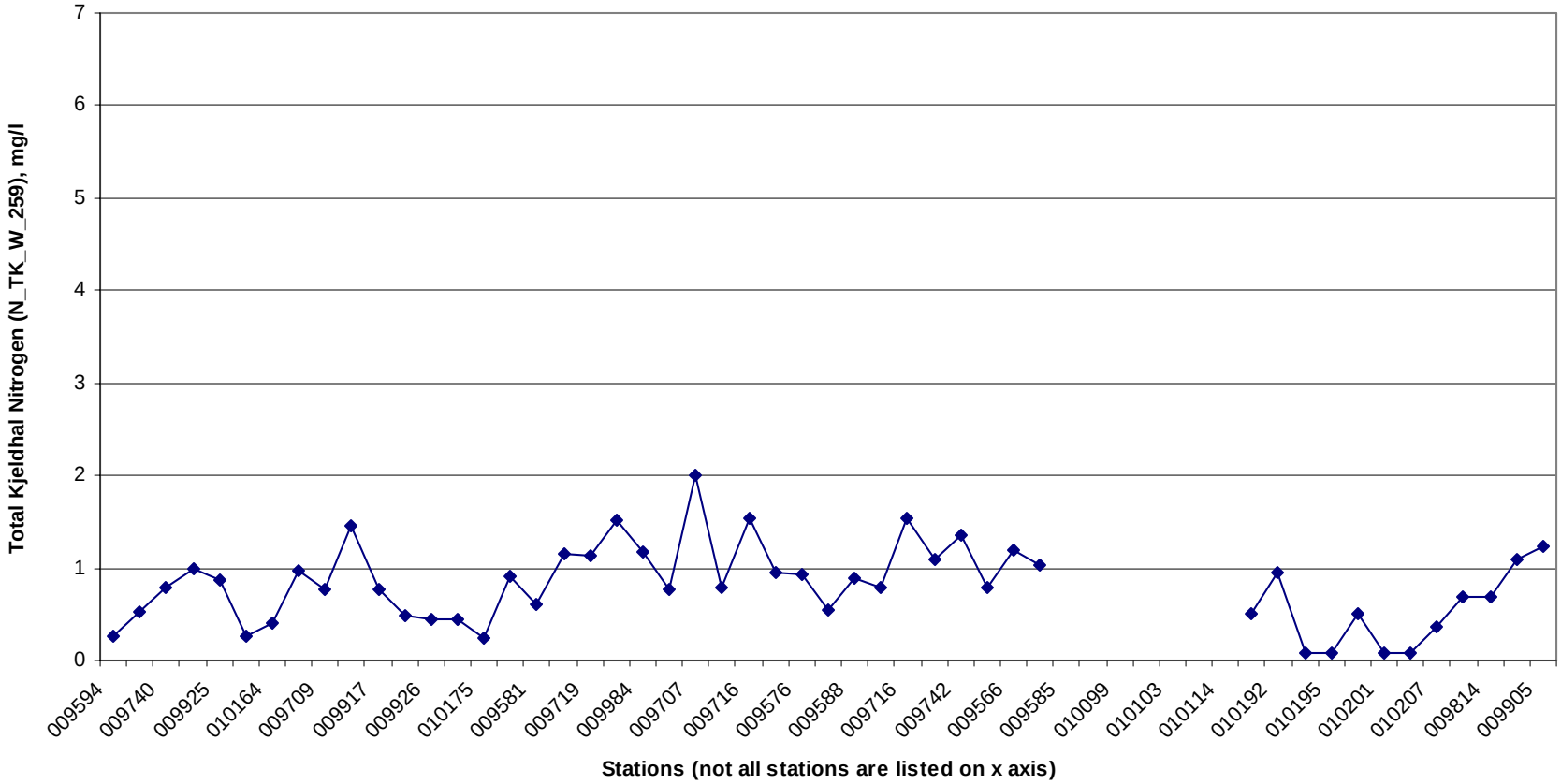


Figure 38. Ammonia In Nebraska Coldwater-A Reference Streams, 1997-2001 R-EMAP

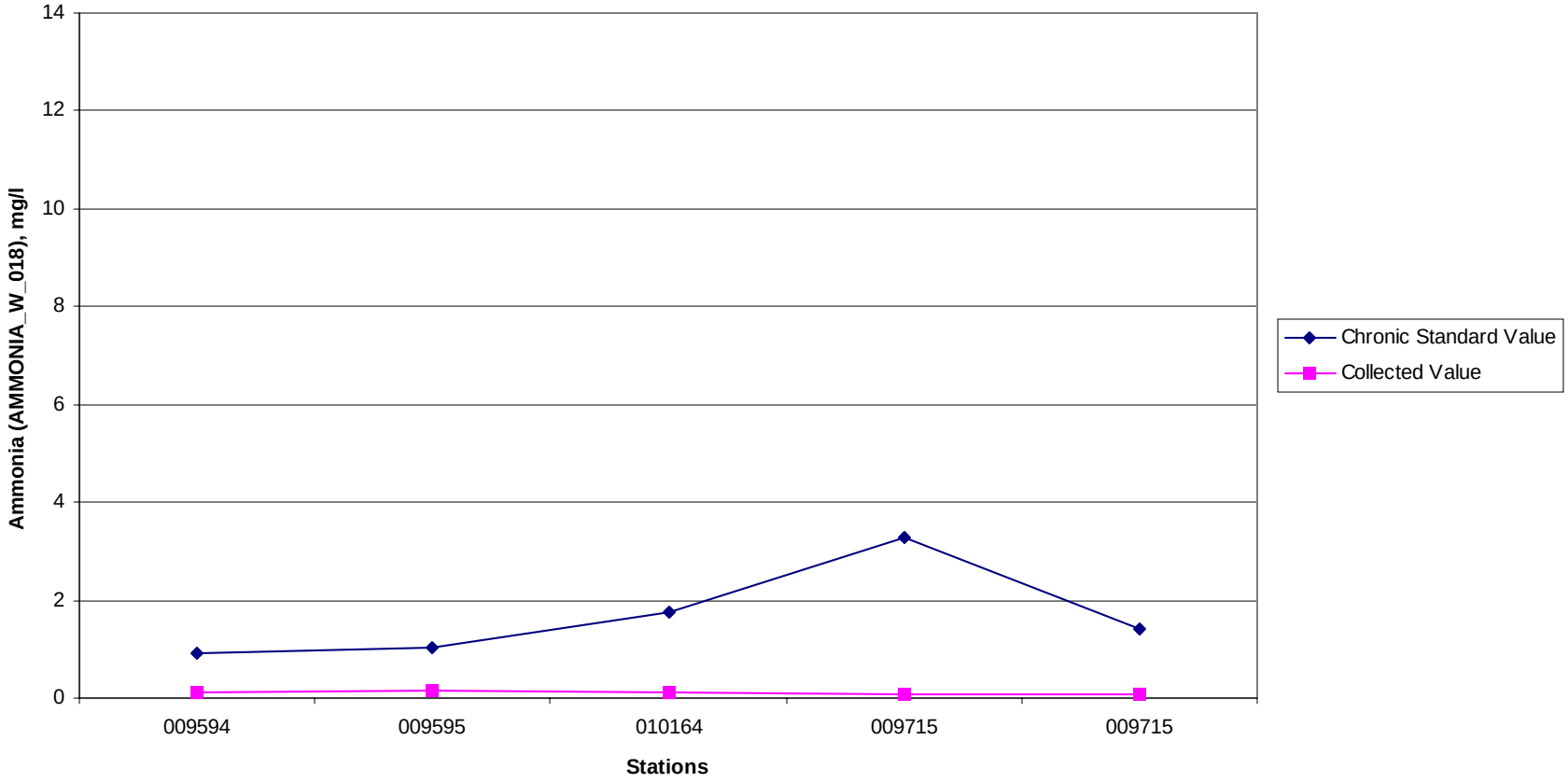


Figure 39. Ammonia In Nebraska Coldwater-B Perennial Streams, 1997-2001 R-EMAP

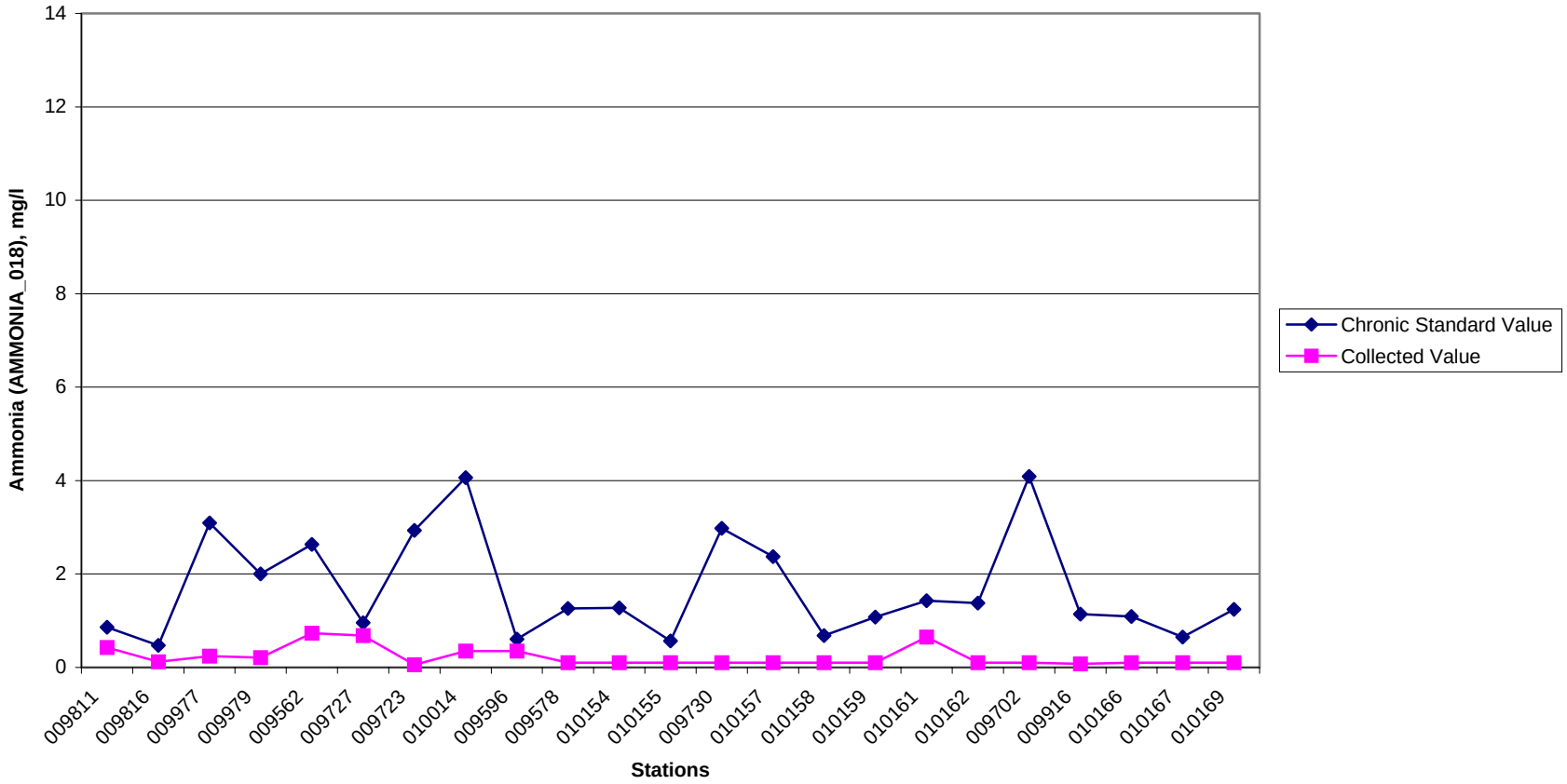


Figure 40. Ammonia In Nebraska Coldwater-B Reference Streams, 1997-2001 R-EMAP

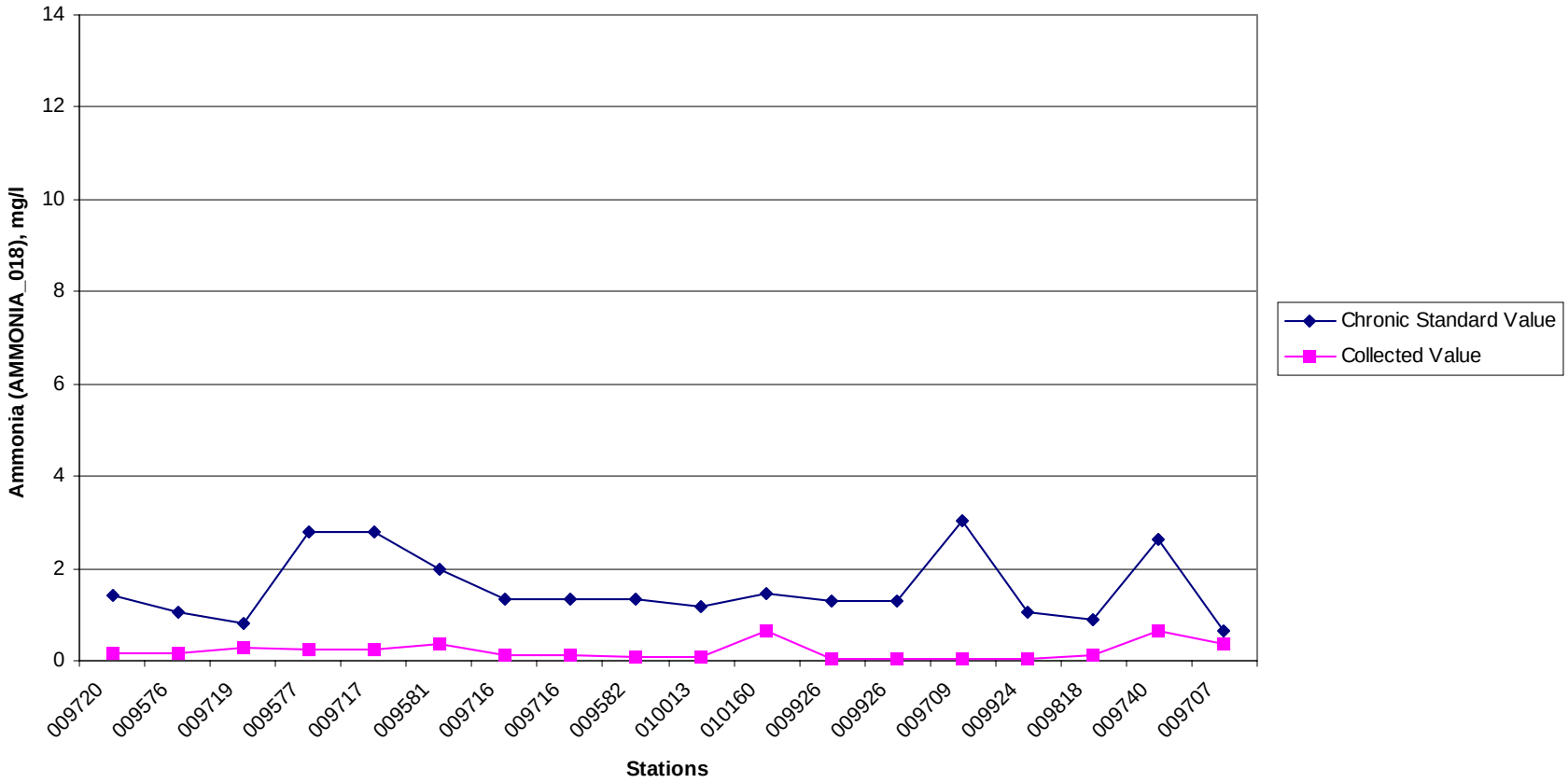


Figure 41. Ammonia In Nebraska Warmwater-A Perennial Streams, 1997-2001 R-EMAP

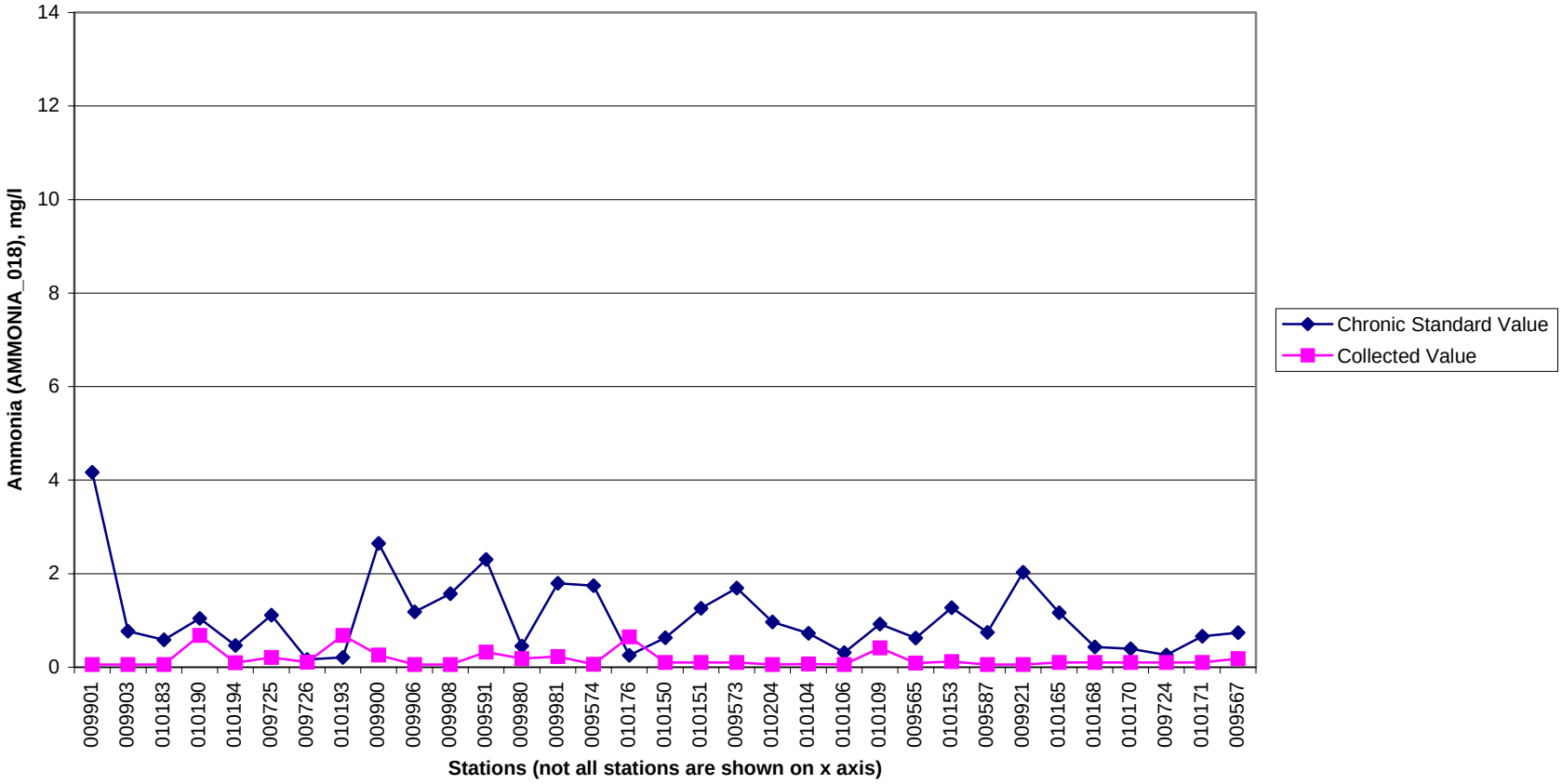


Figure 42. Ammonia In Nebraska Warmwater-A Reference Streams, 1997-2001 R-EMAP

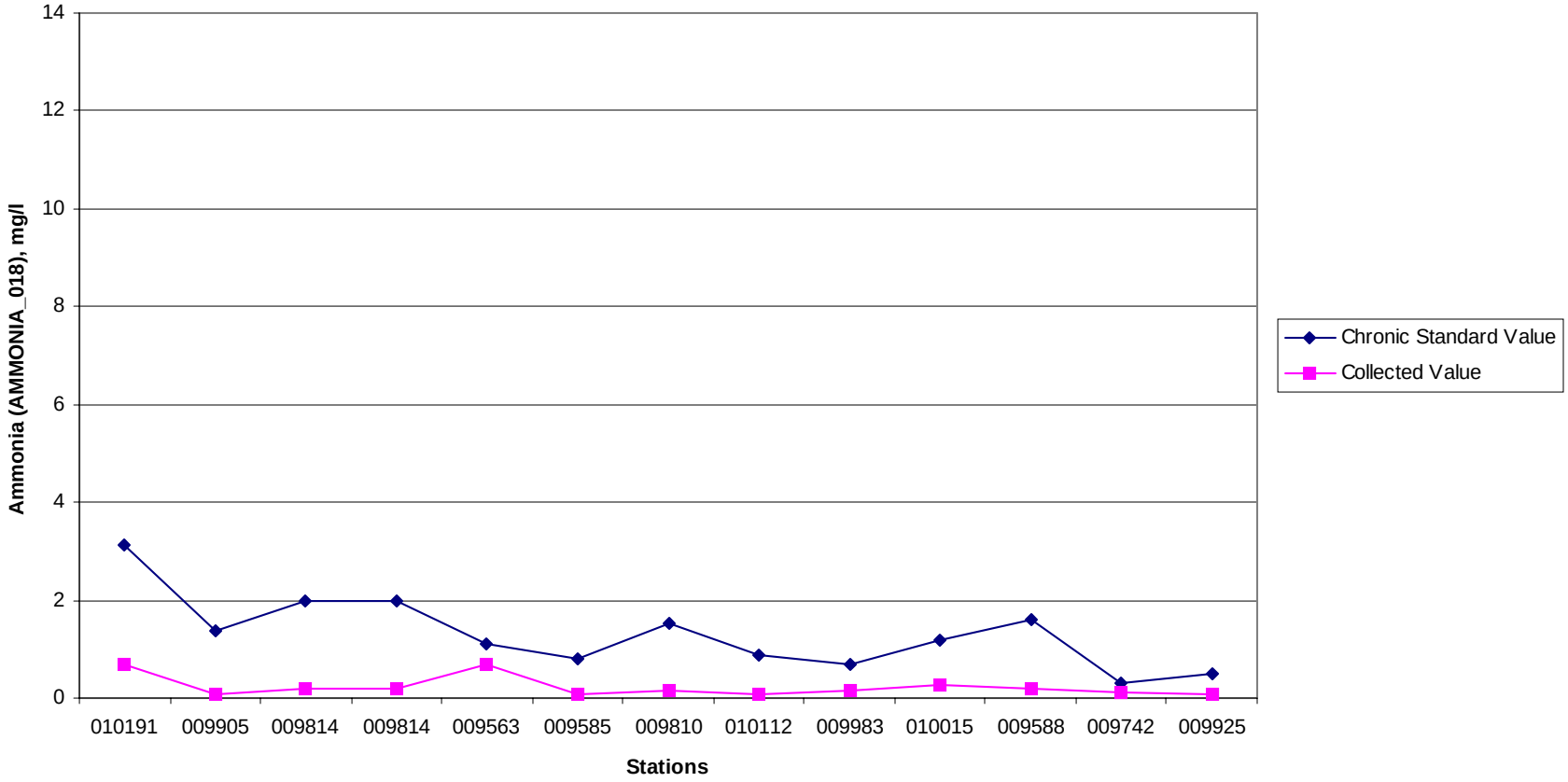


Figure 43. Ammonia In Nebraska Warmwater-B Perennial Streams, 1997-2001 R-EMAP

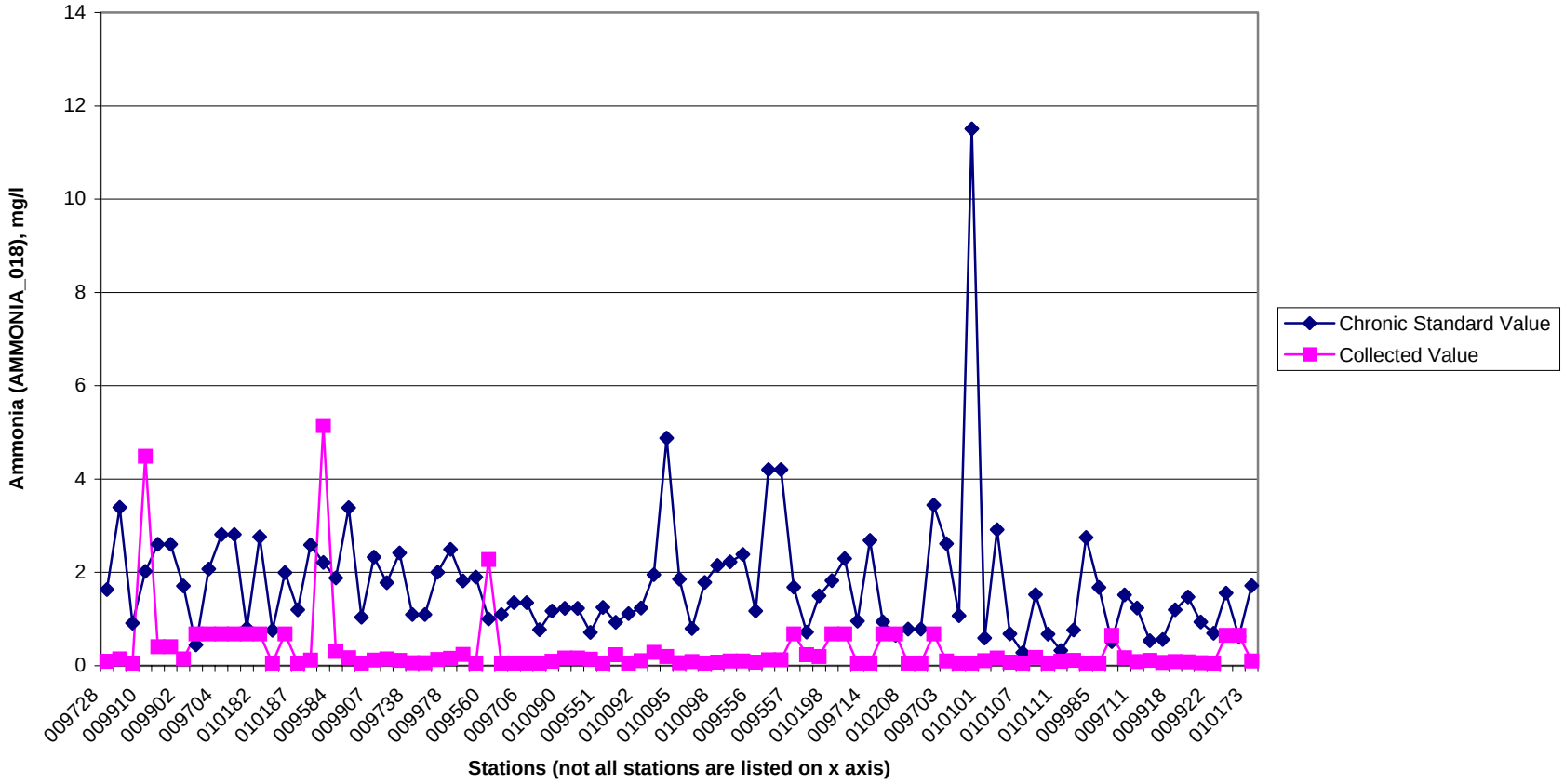


Figure 44. Ammonia In Nebraska Warmwater-B Reference Streams, 1997-2001 R-EMAP

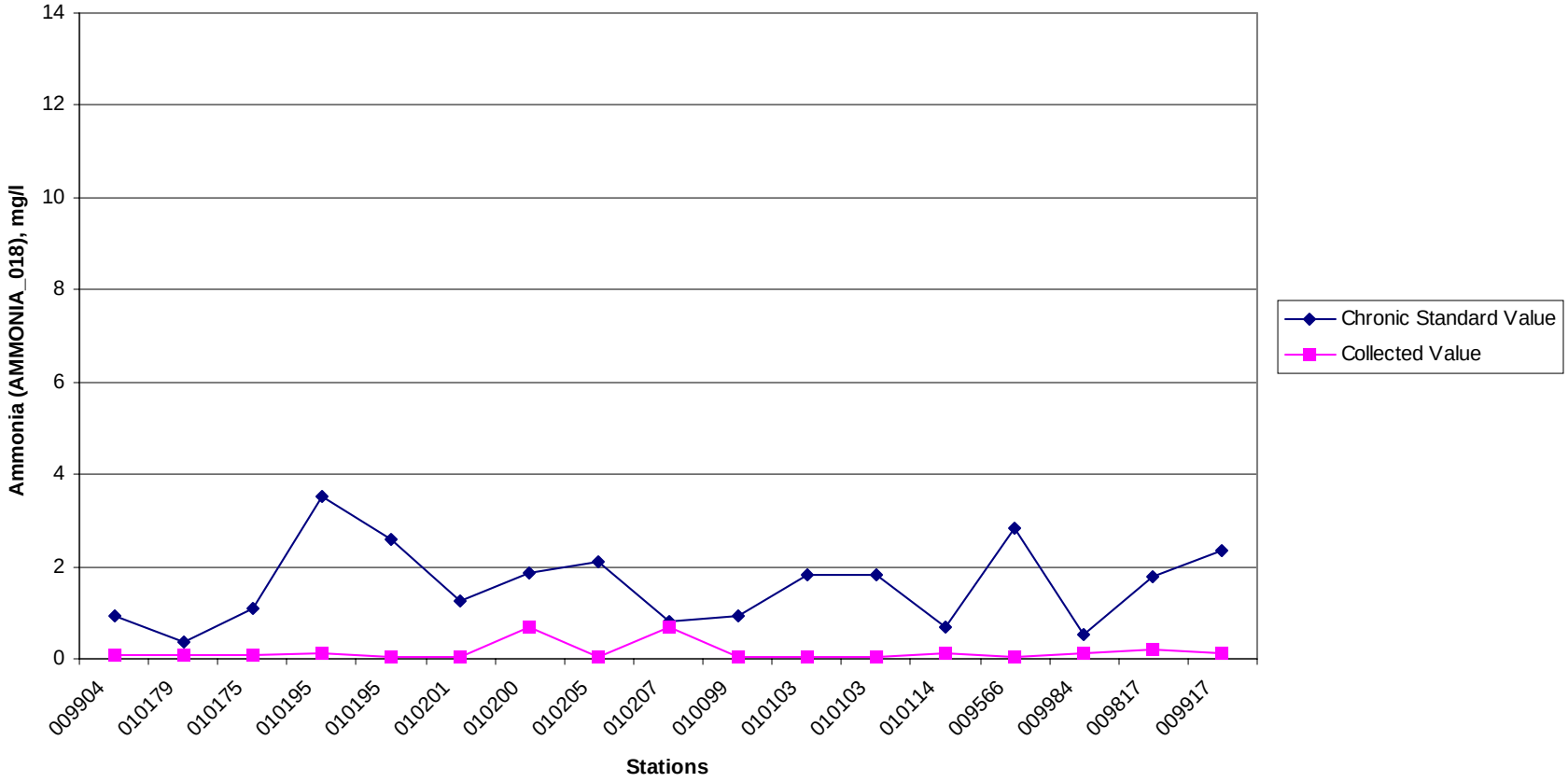


Figure 45. Nickel In Nebraska Warmwater-A Perennial Streams, 1997-2001 R-EMAP

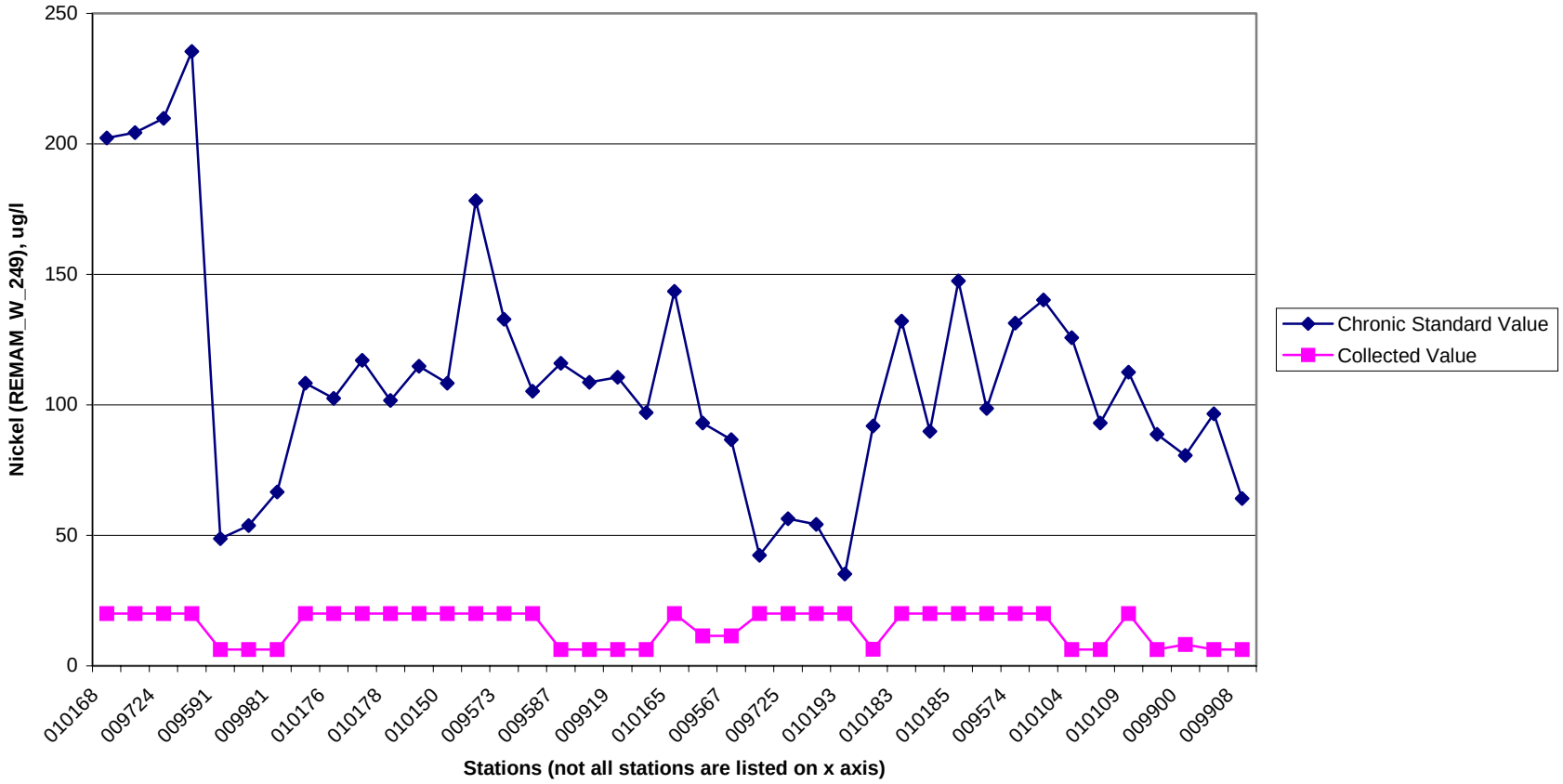


Figure 46. Nickel In Nebraska Warmwater-A Reference Streams, 1997-2001 R-EMAP

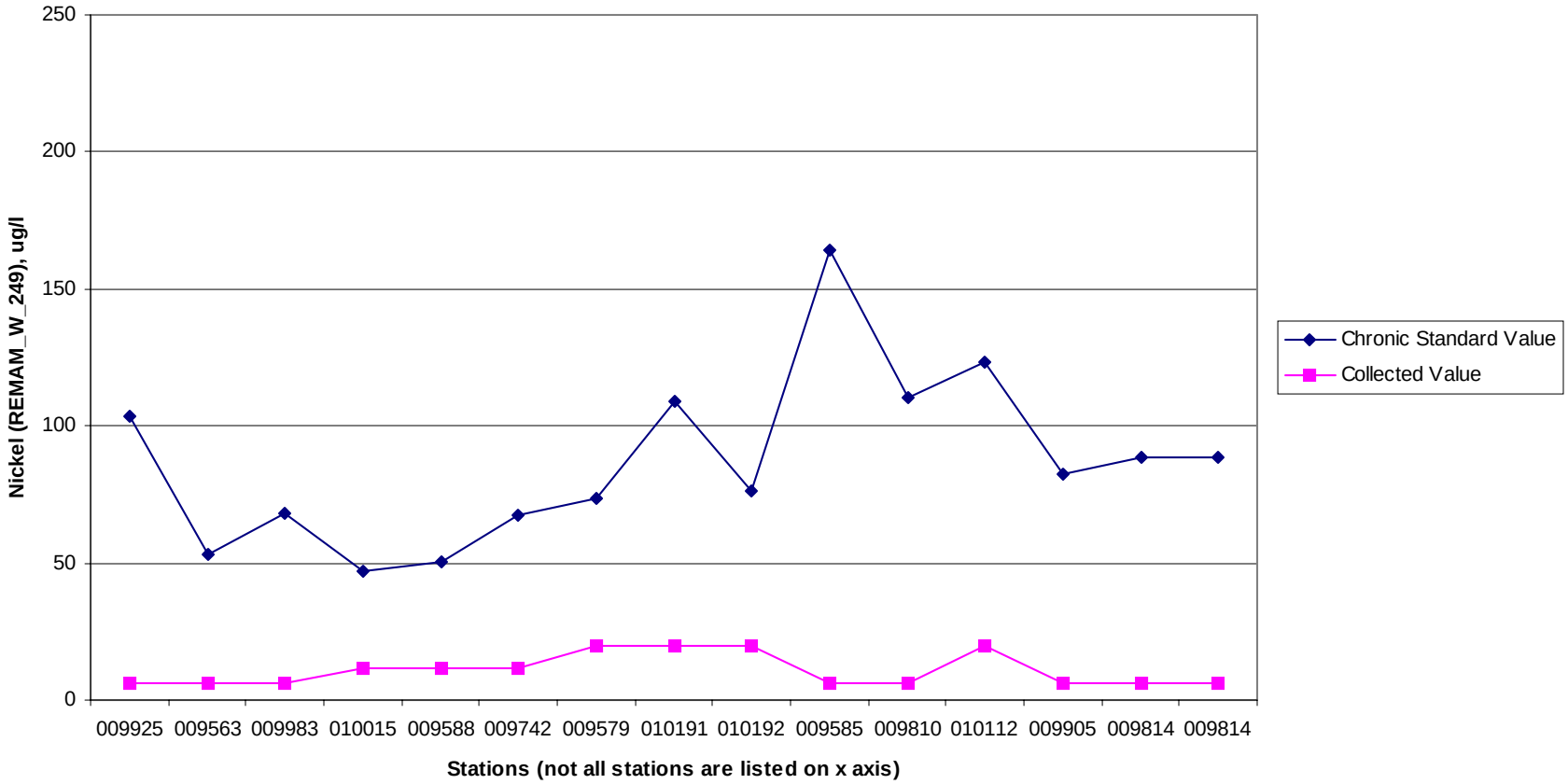


Figure 47. Zinc In Nebraska Warmwater-A Perennial Streams, 1997-2001 R-EMAP

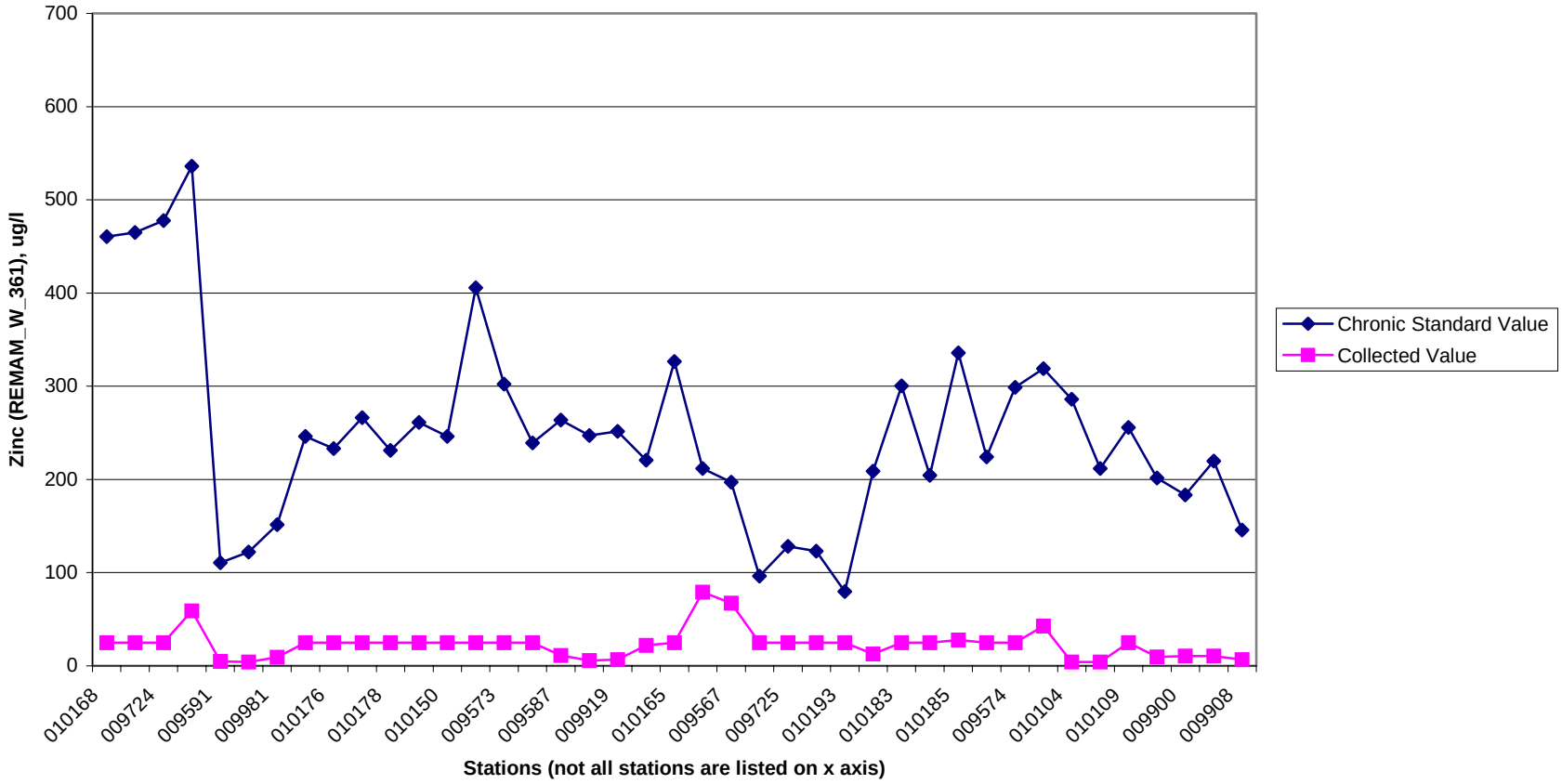


Figure 48. Zinc In Nebraska Warmwater-A Reference Streams, 1997-2001 R-EMAP

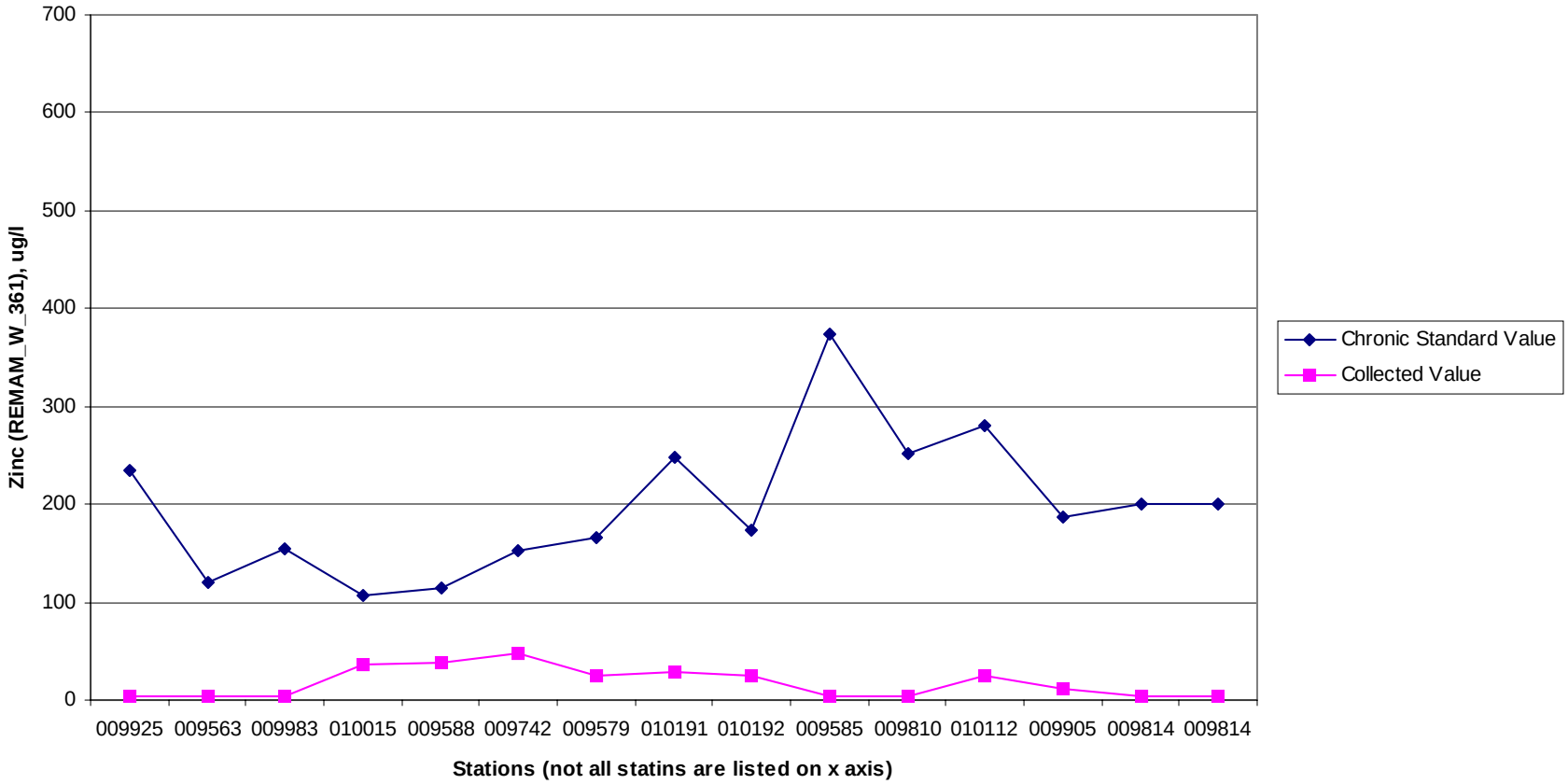
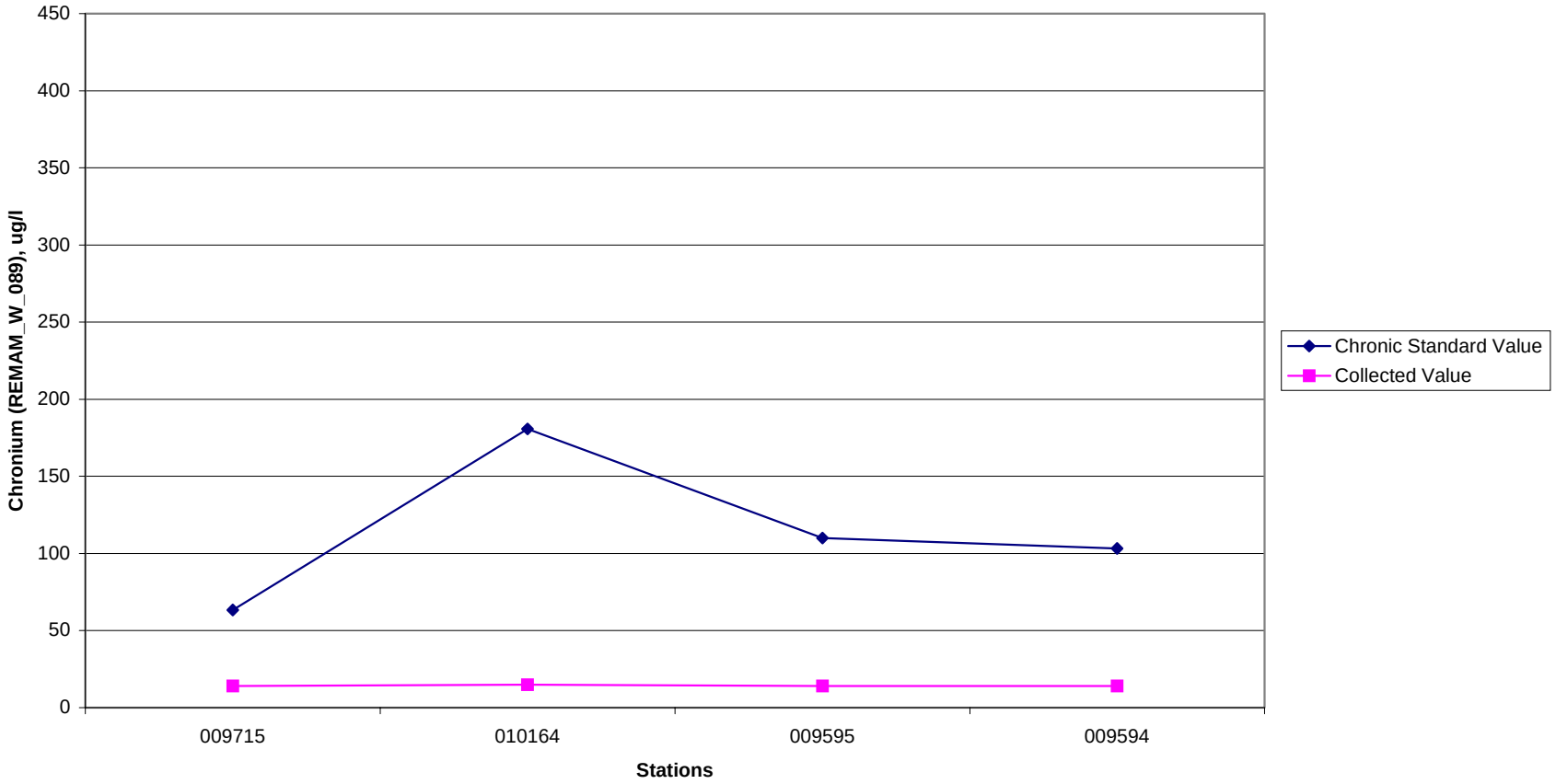


Figure 49. Chromium In Nebraska Coldwater-A Reference Streams, 1997-2001 R-EMAP



Firgure 50. Chromium In Nebraska Coldwater-B Perennial Streams, 1997-2001 R-EMAP

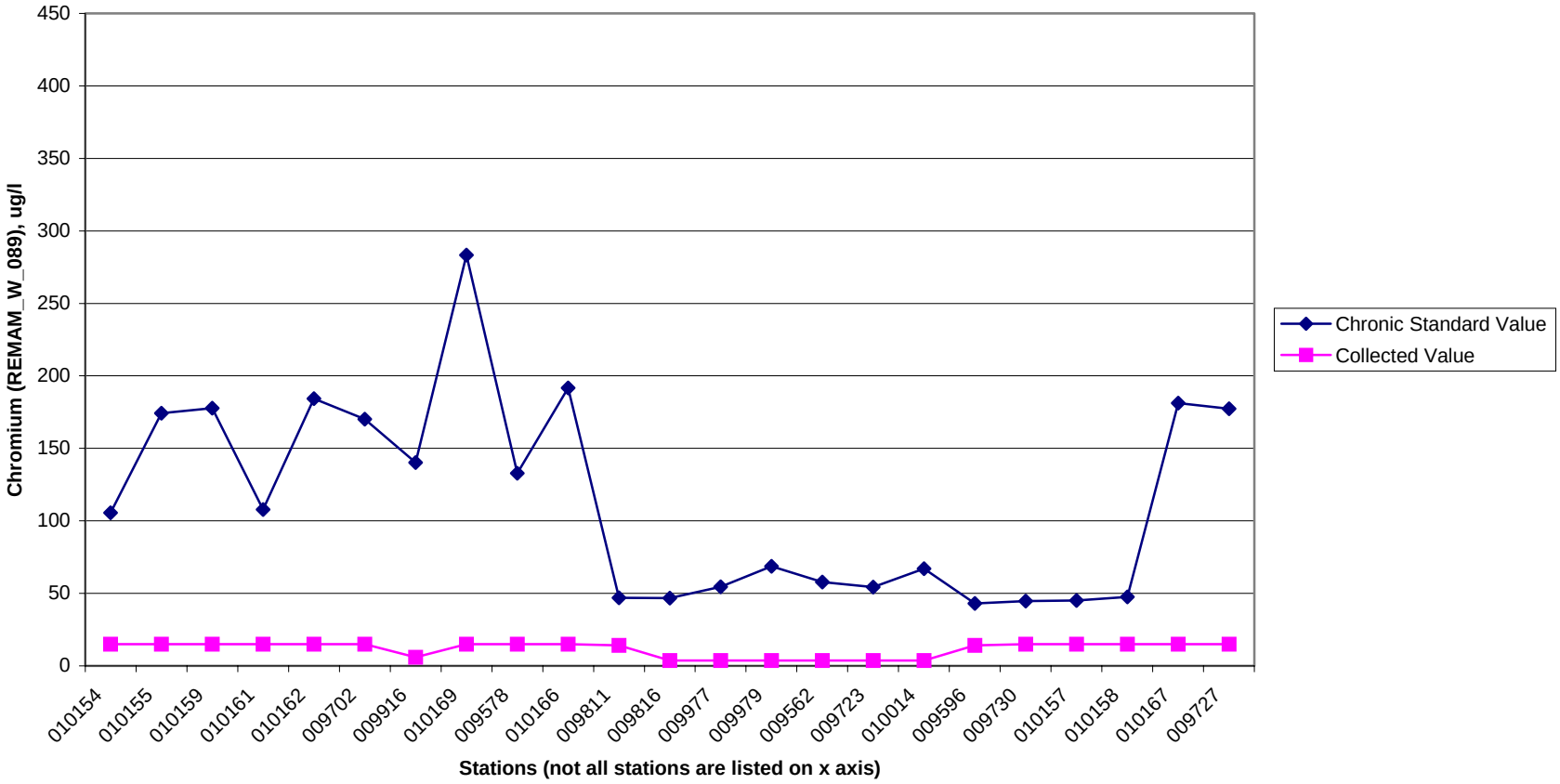


Figure 51. Chromium In Nebraska Coldwater-B Reference Streams, 1997-2001 R-EMAP

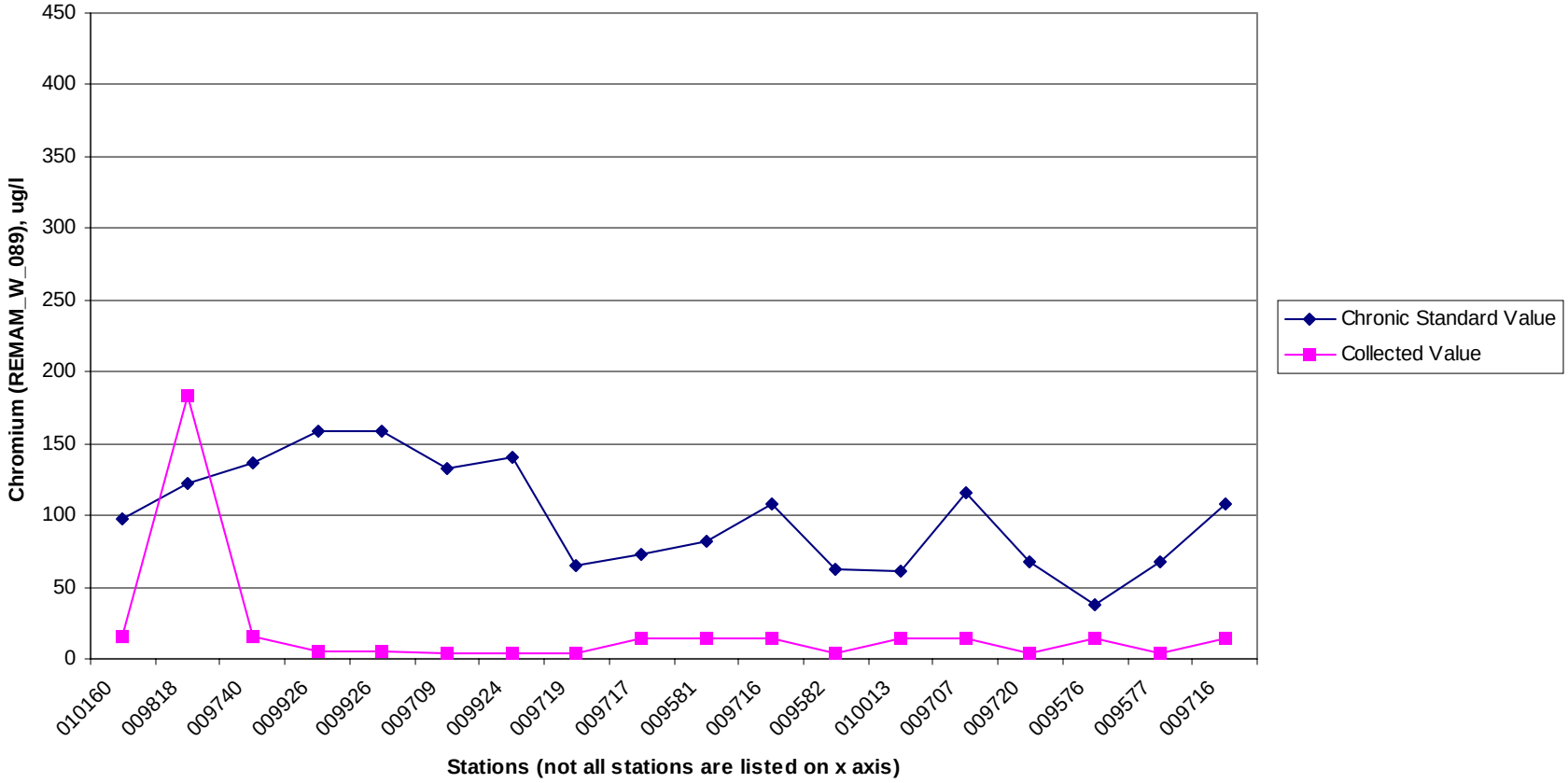


Figure 52. Chromium In Nebraska Warmwater-A Perennial Streams, 1997-2001 R-EMAP

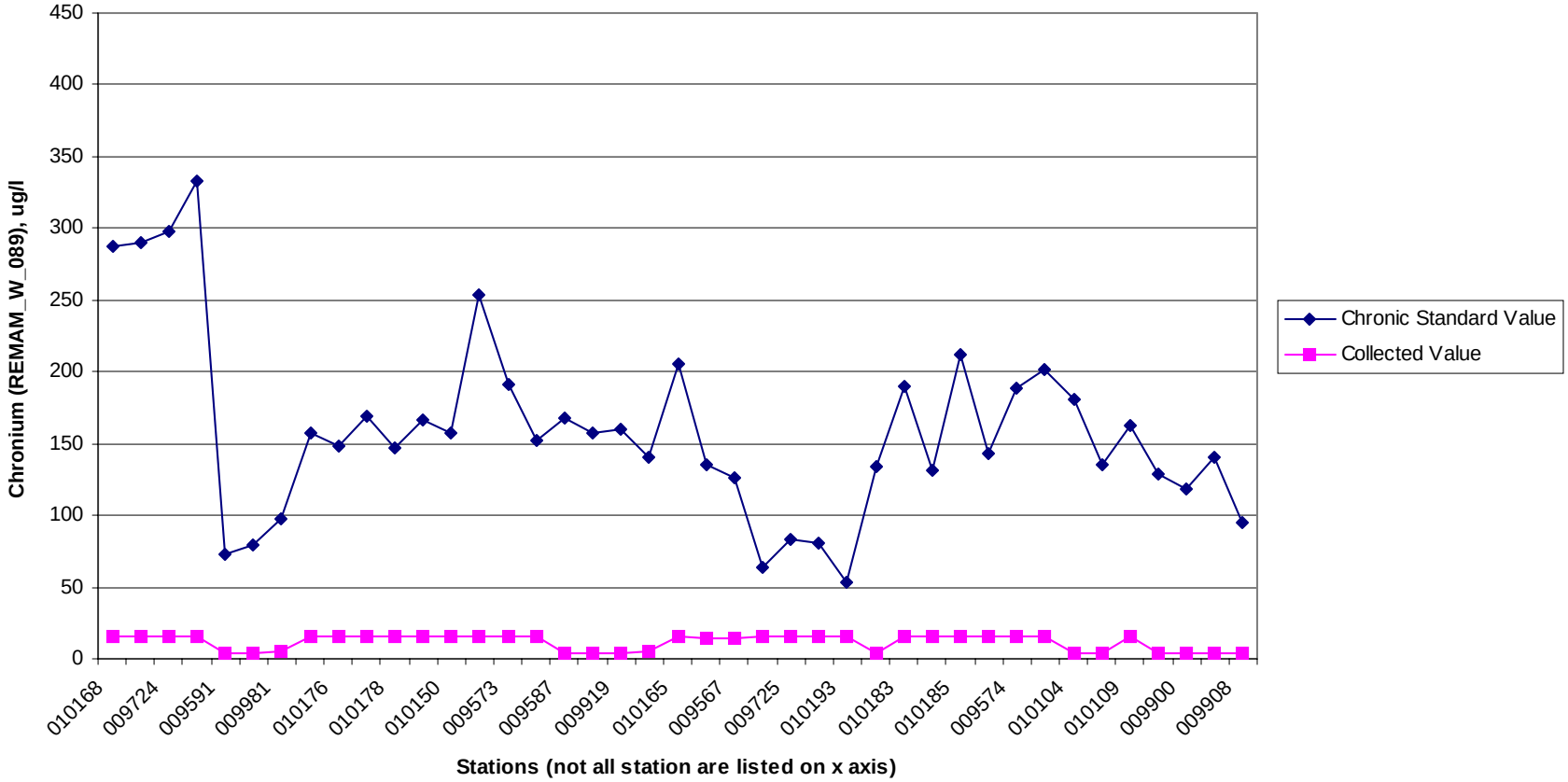


Figure 53. Chromium In Nebraska Warmwater-A Reference Streams, 1997-2001 R-EMAP

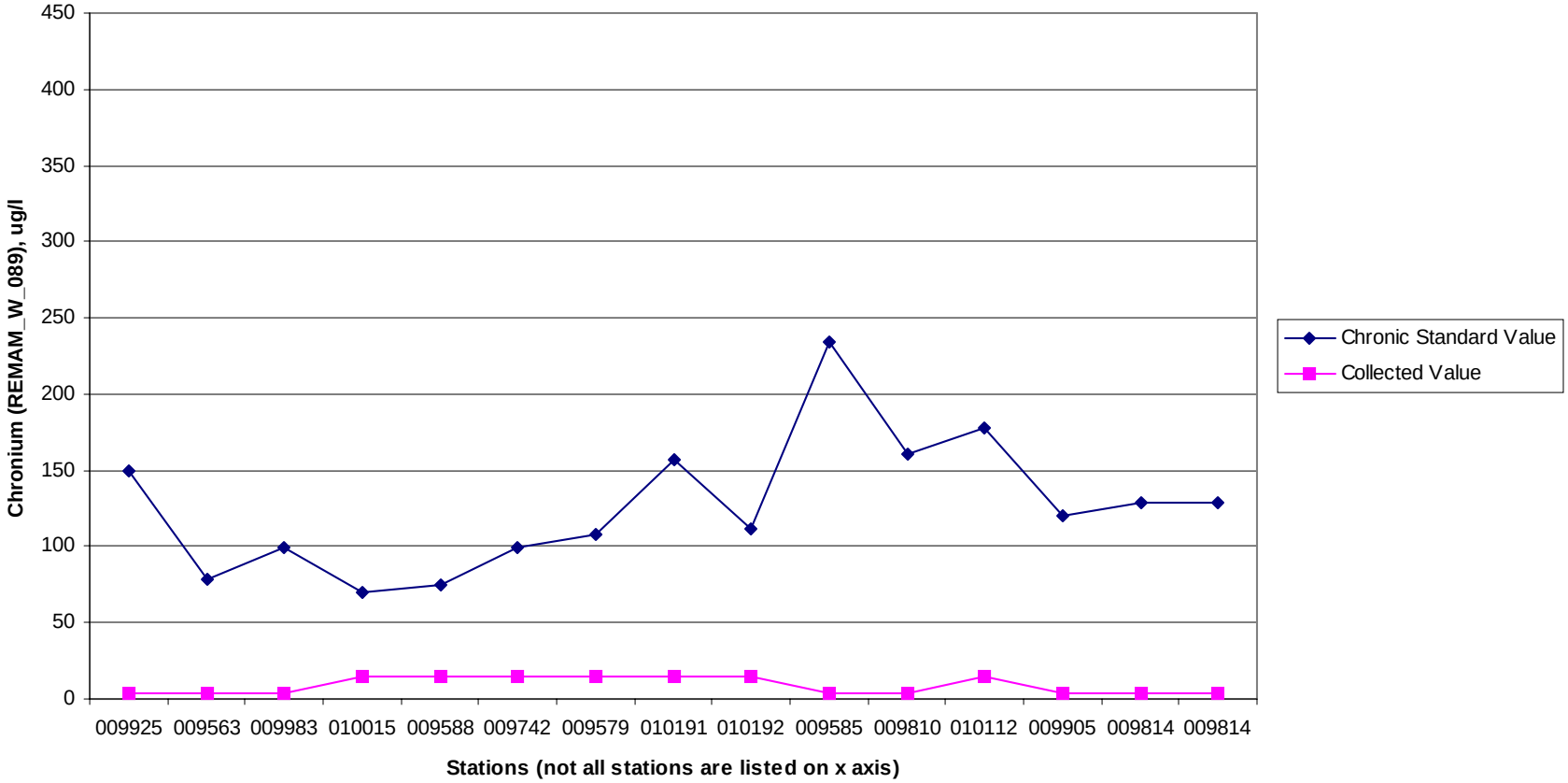


Figure 54. Chromium In Nebraska Warmwater-B Perennial Streams, 1997-2001 R-EMAP

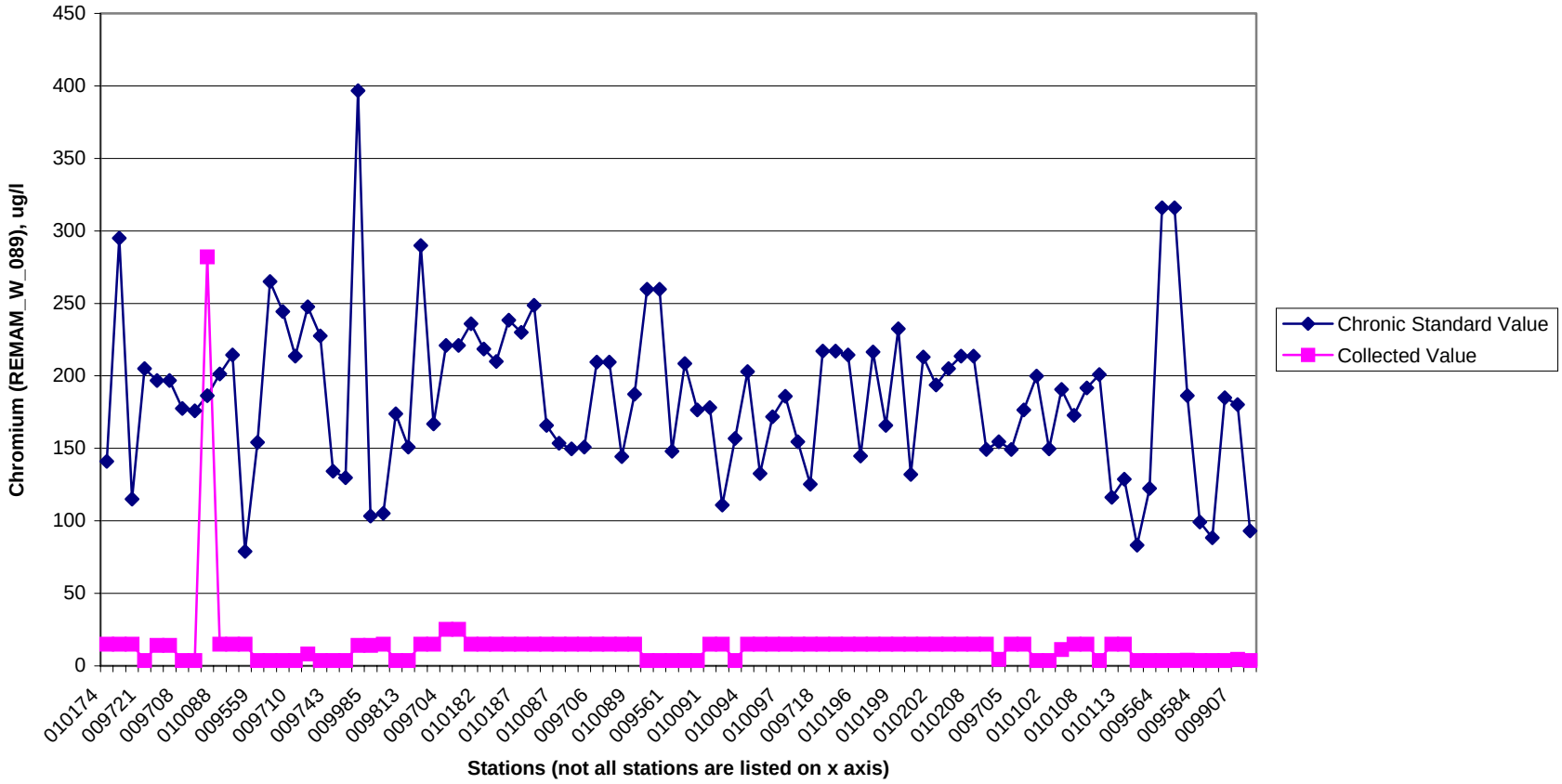


Figure 55. Chromium In Nebraska Warmwater-B Reference Streams, 1997-2001 R-EMAP

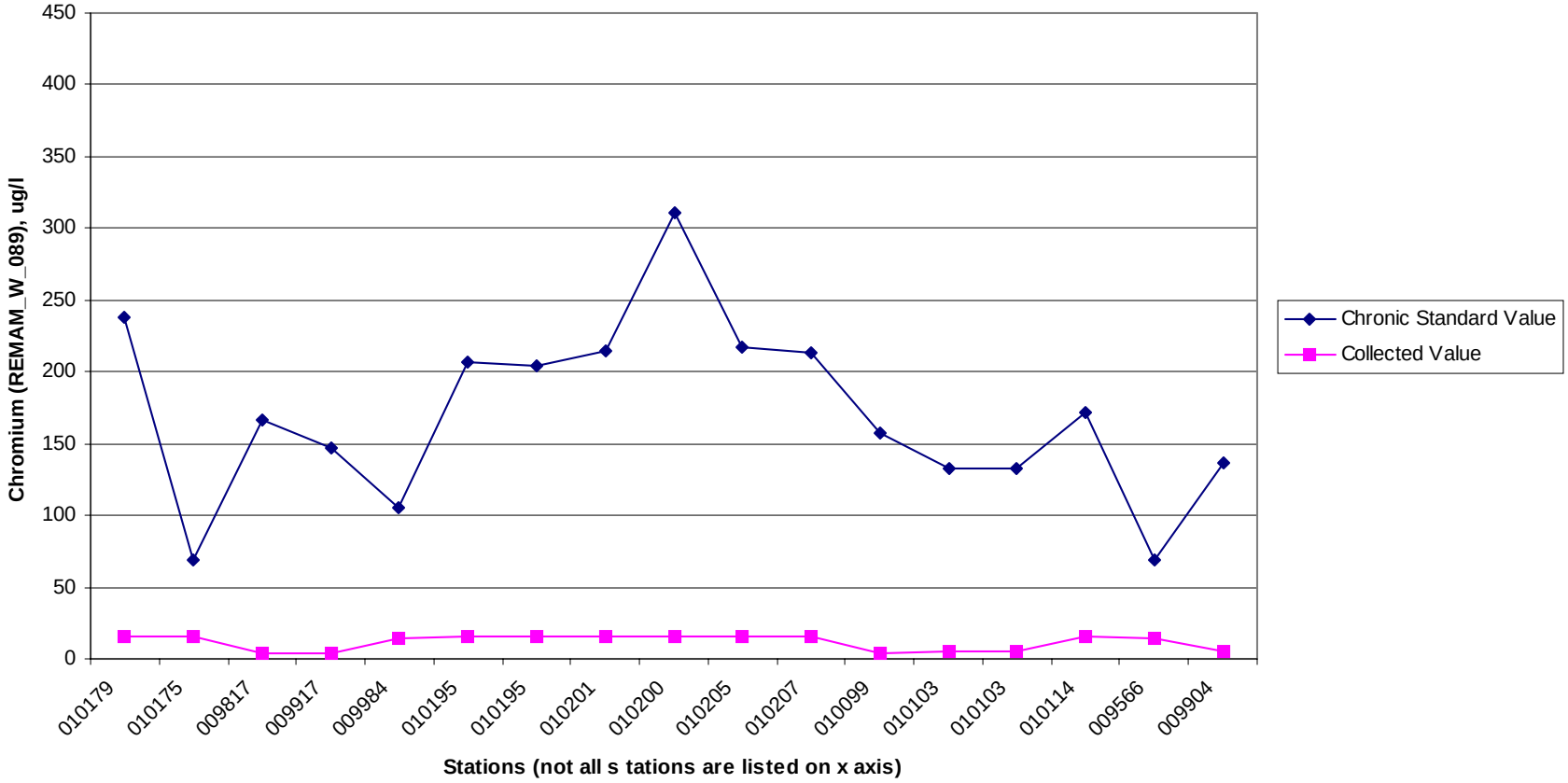


Figure 56. Copper In Nebraska Coldwater-A Reference Streams, 1997-2001 R-EMAP

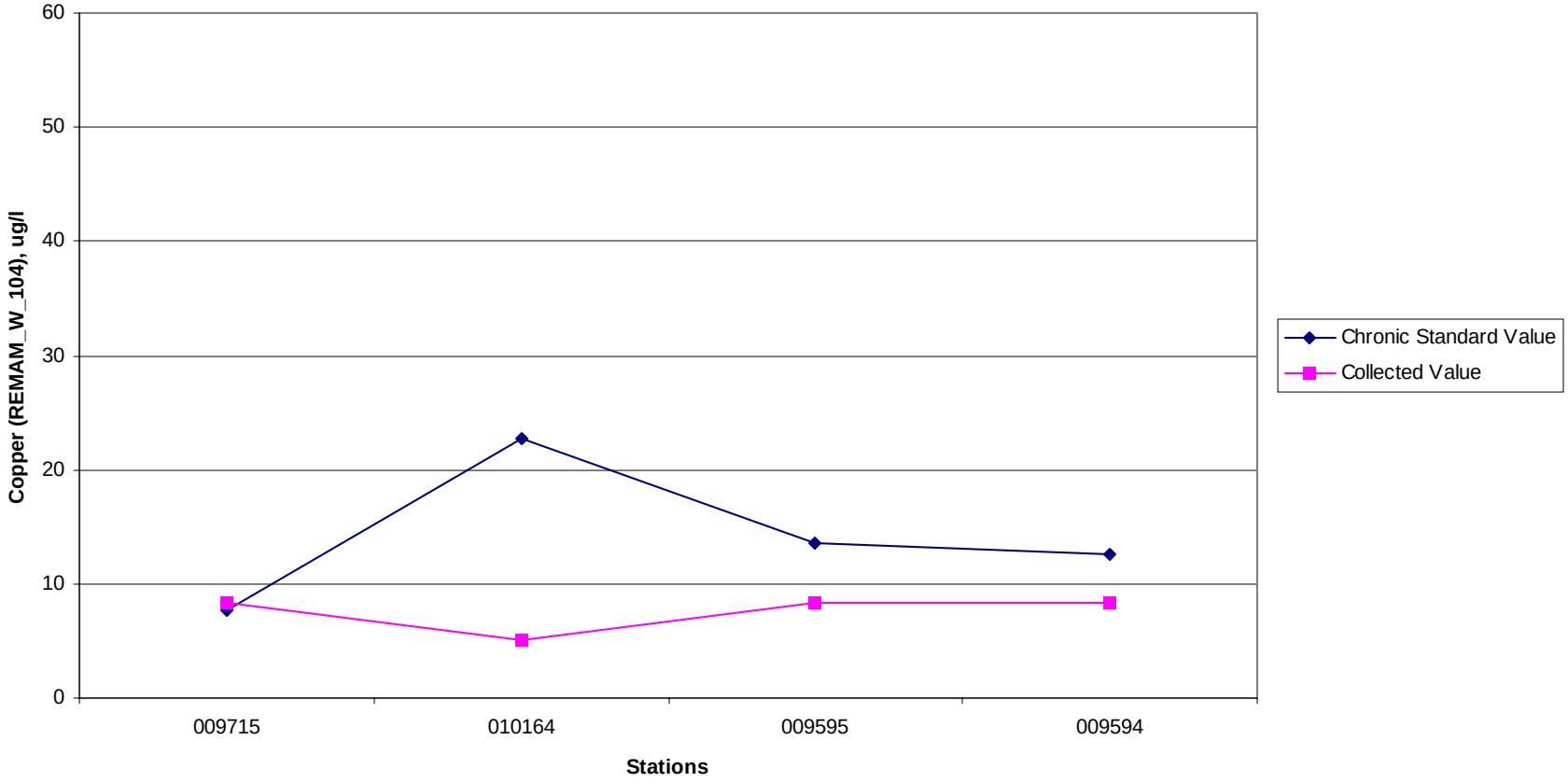


Figure 57. Copper In Nebraska Coldwater-B Perennial Streams, 1997-2001 R-EMAP

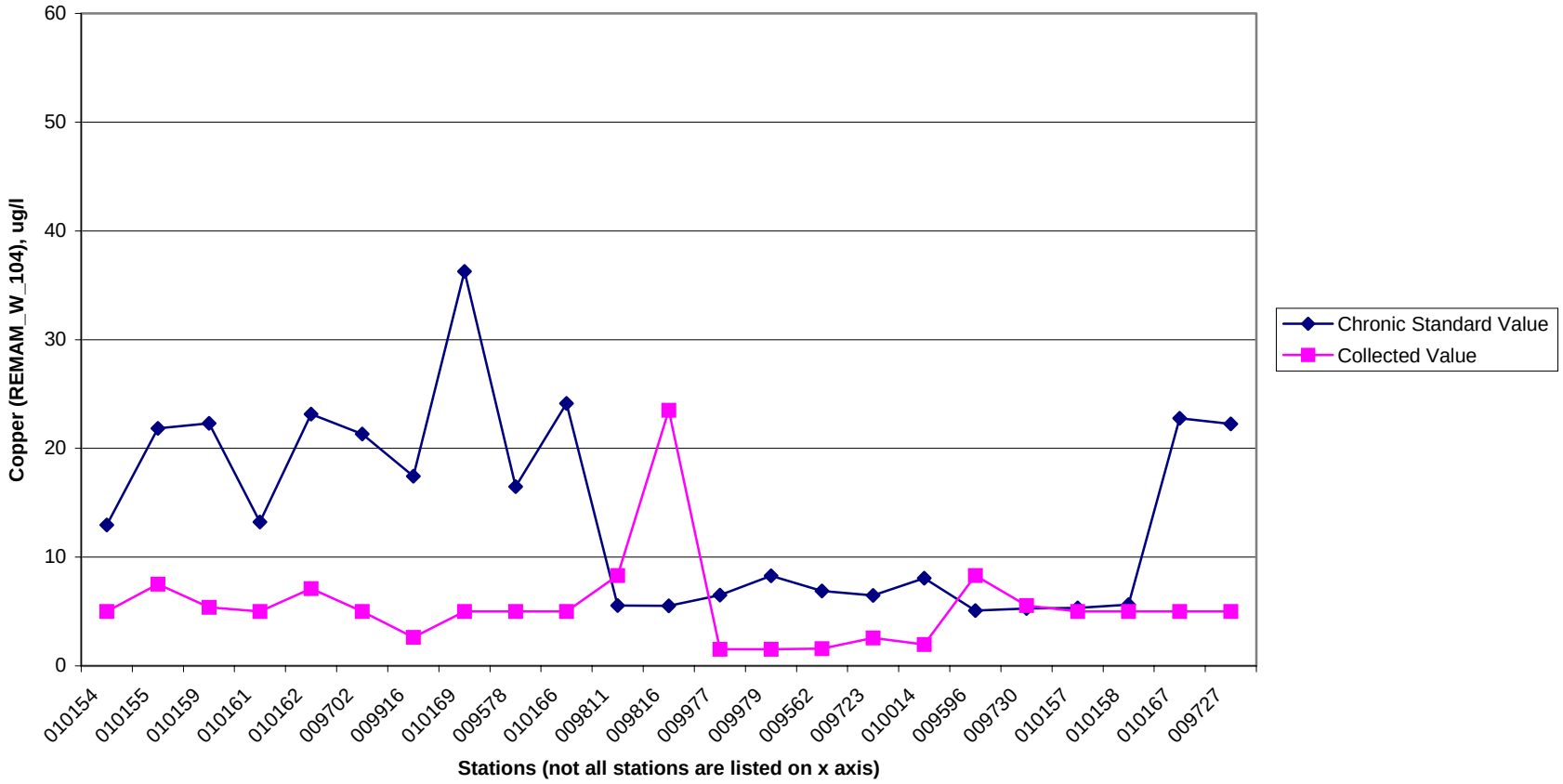


Figure 58. Copper In Nebaraska Coldwater-B Reference Streams, 1997-2001 R-EMAP

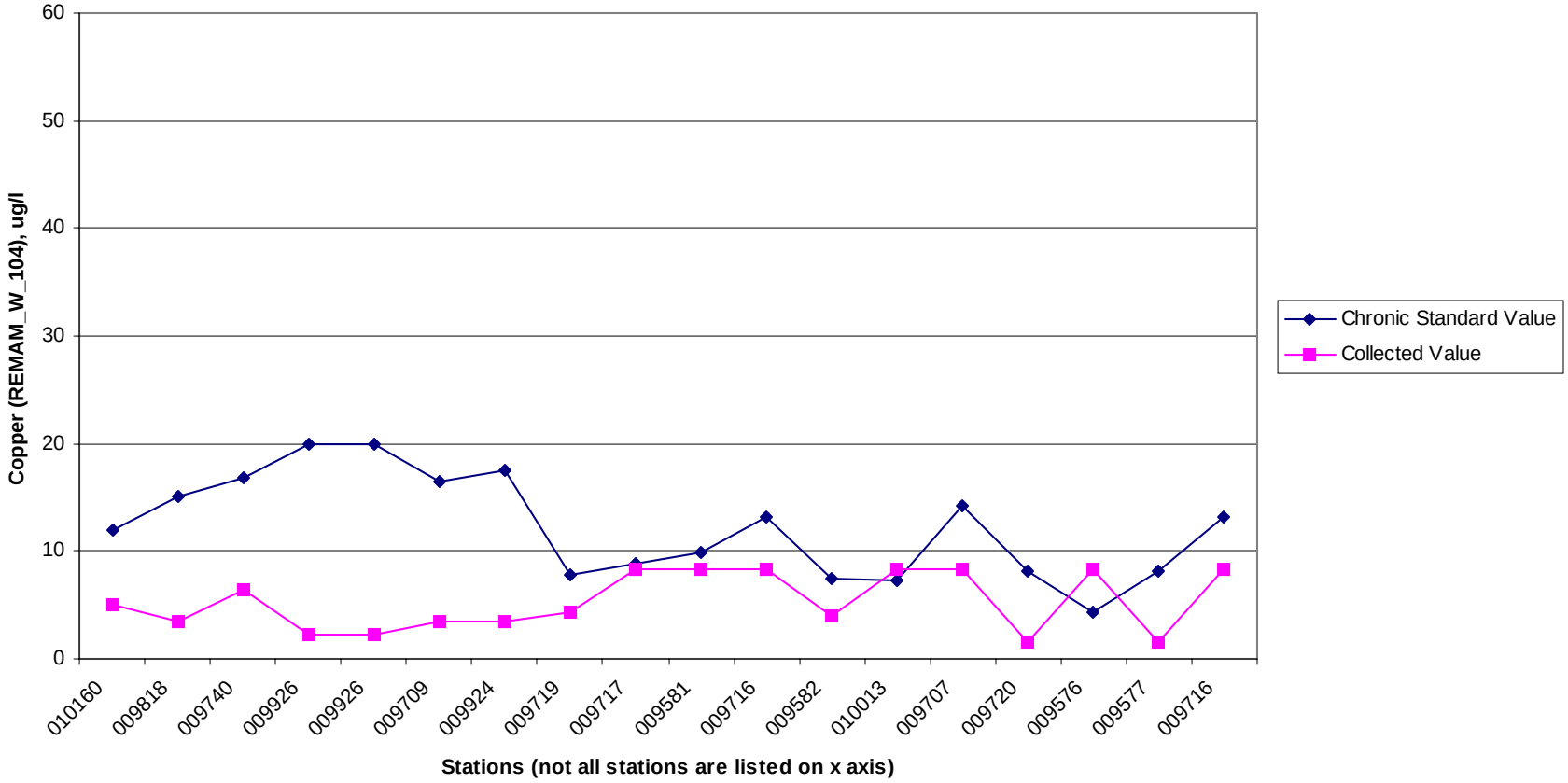


Figure 59. Copper In Nebraska Warmwater-A Perennial Streams, 1997-2001 R-EMAP

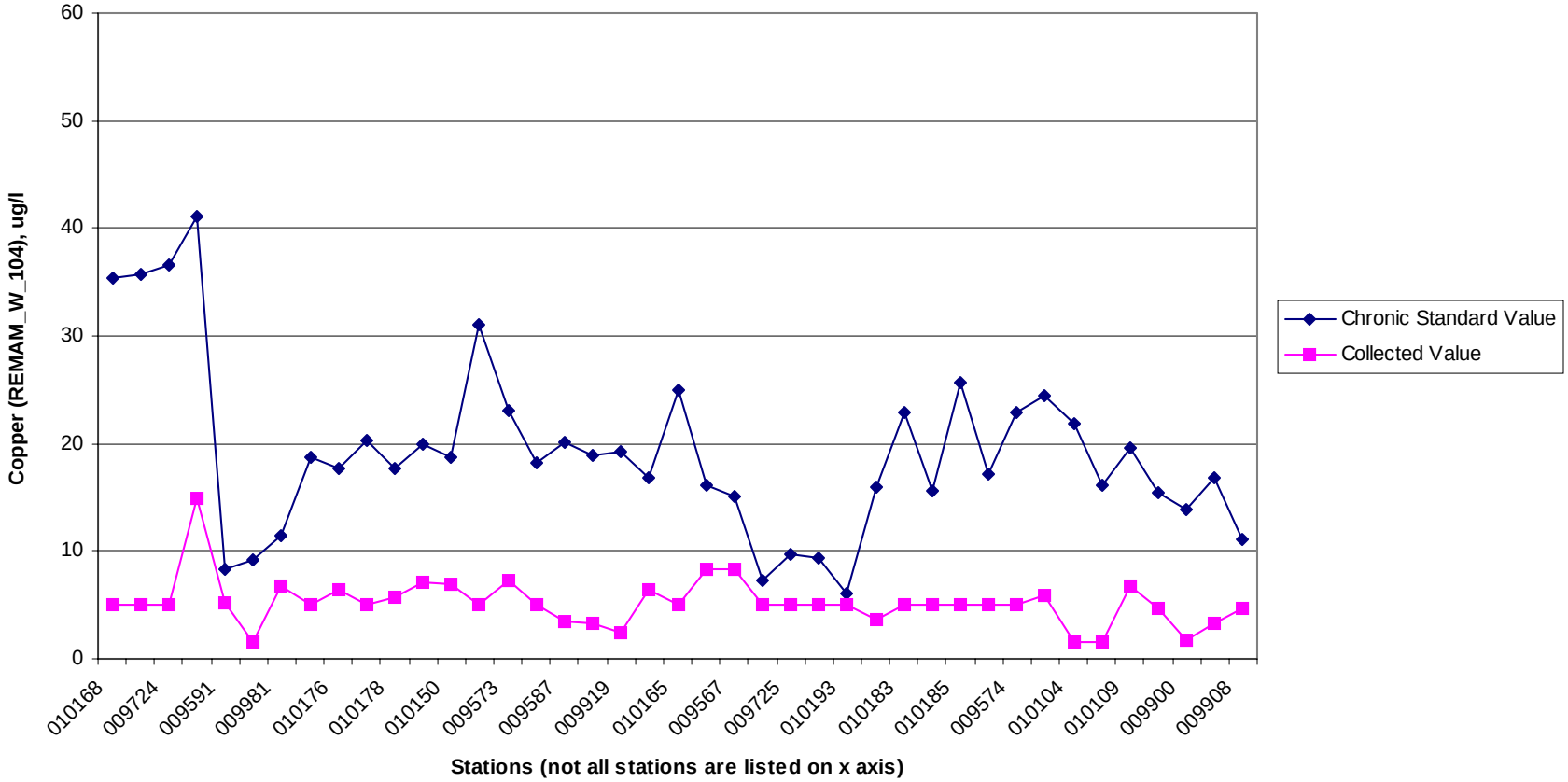


Figure 60. Copper In Nebraska Warmwater-A Reference Streams, 1997-2001 R-EMAP

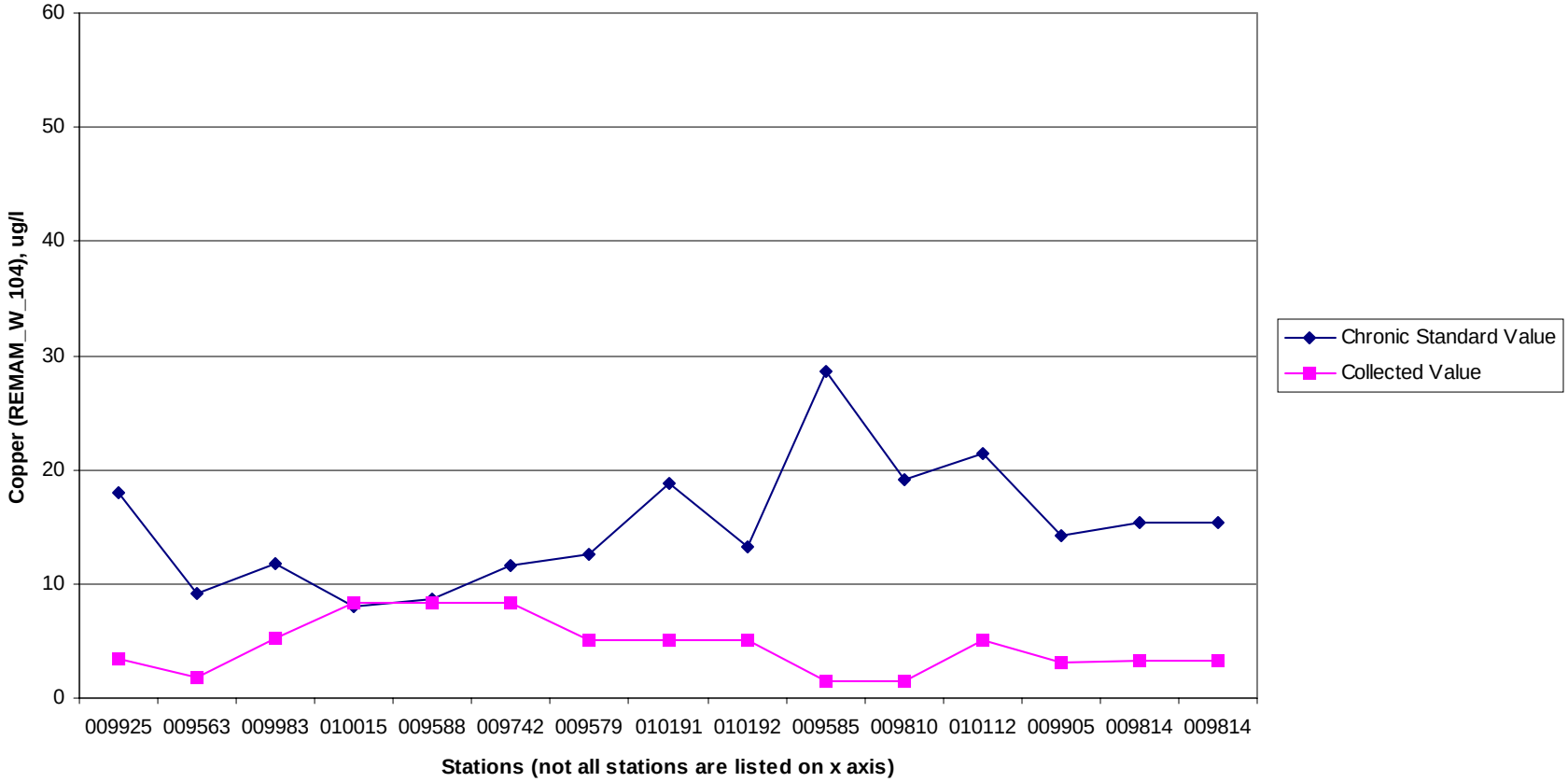


Figure 61. Copper In Nebraska Warmwater-B Perennial Streams, 1997-2001 R-EMAP

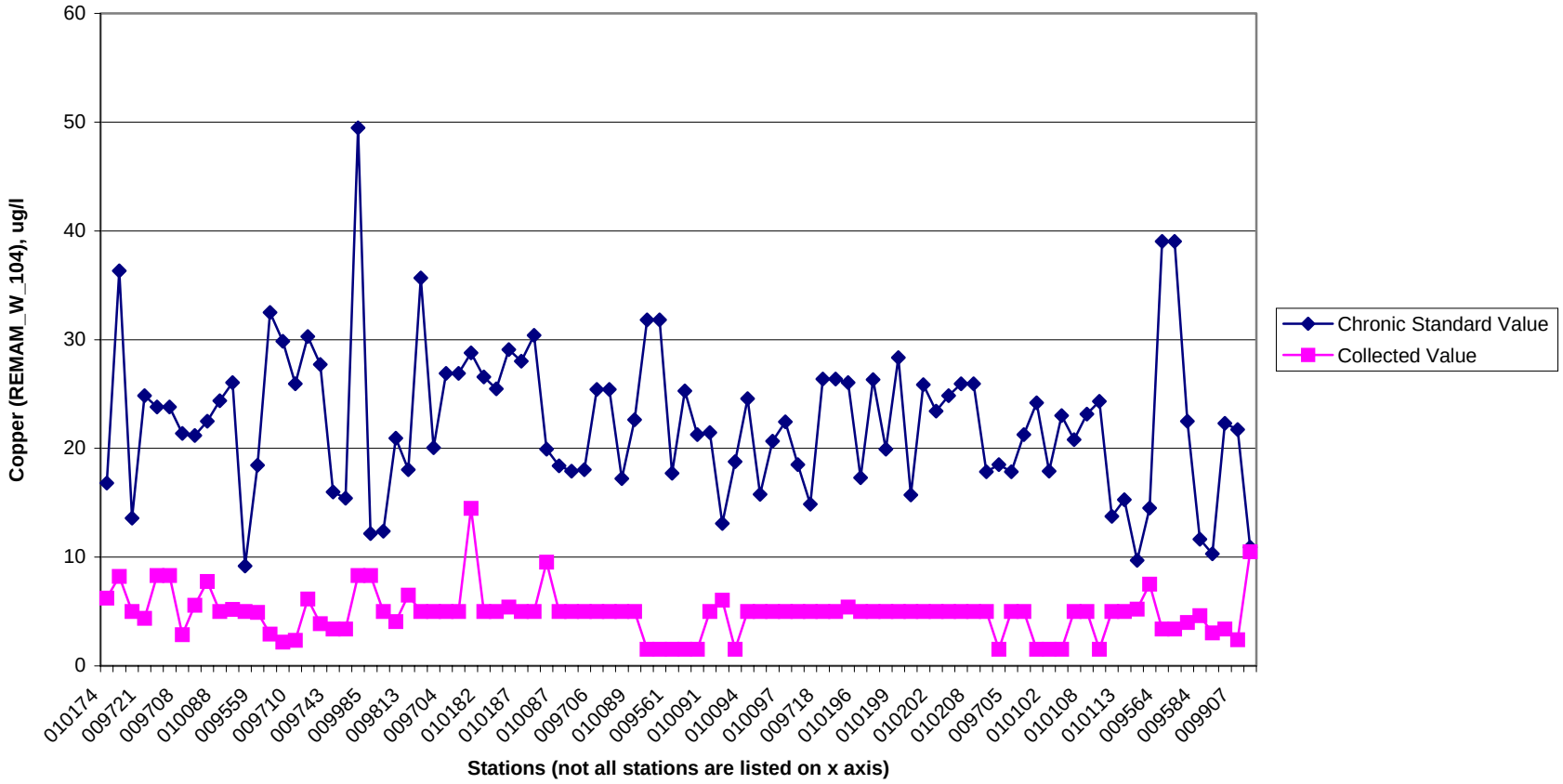


Figure 62. Copper In Nebraska Warmwater-B Reference Streams, 1997-2001 R-EMAP

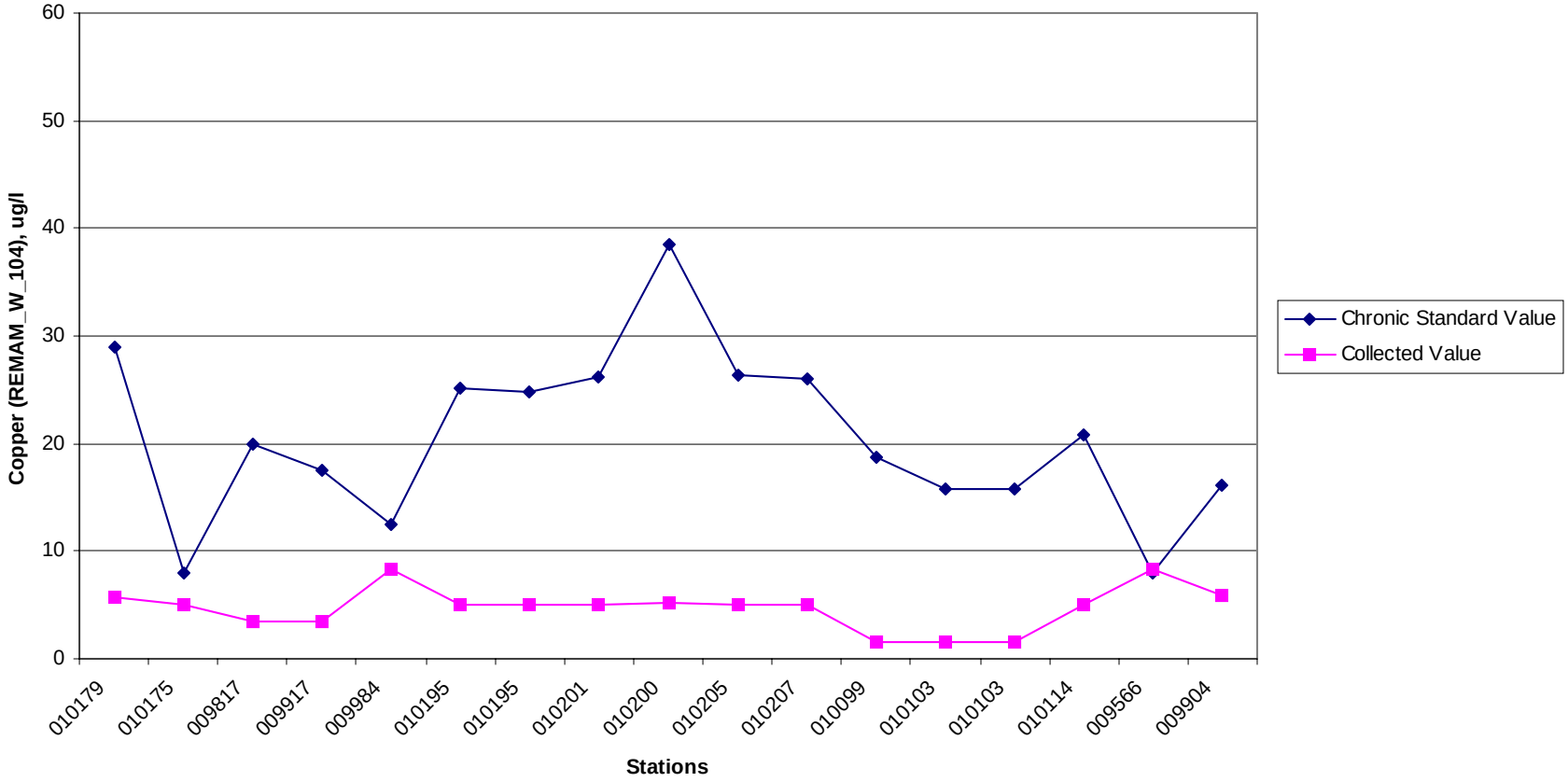


Figure 63. Lead In Nebraska Coldwater-A Reference Streams, 1997-2001 R-EMAP

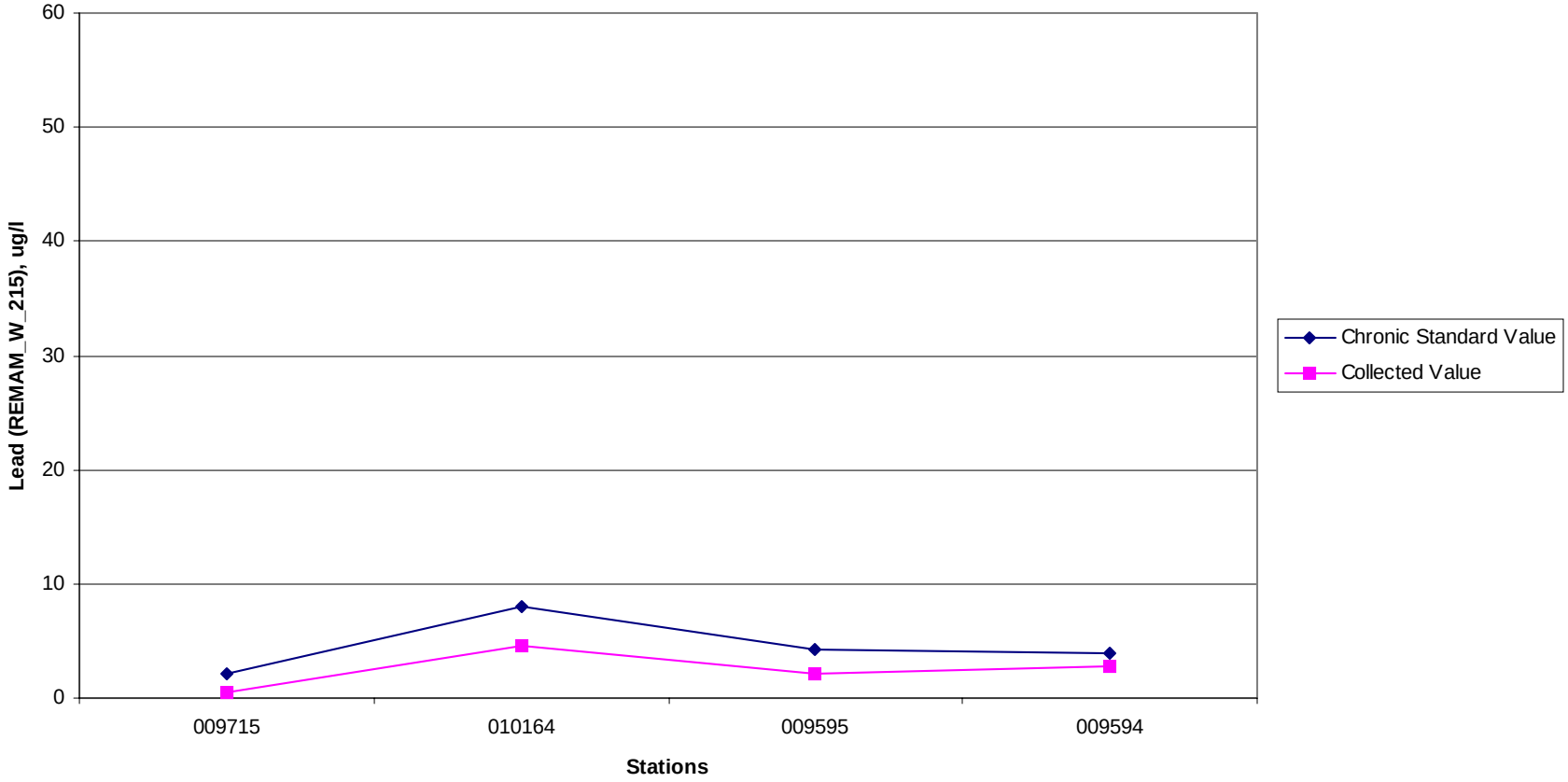


Figure 64. Lead In Coldwater-B Perennial Streams, 1997-2001 R-EMAP

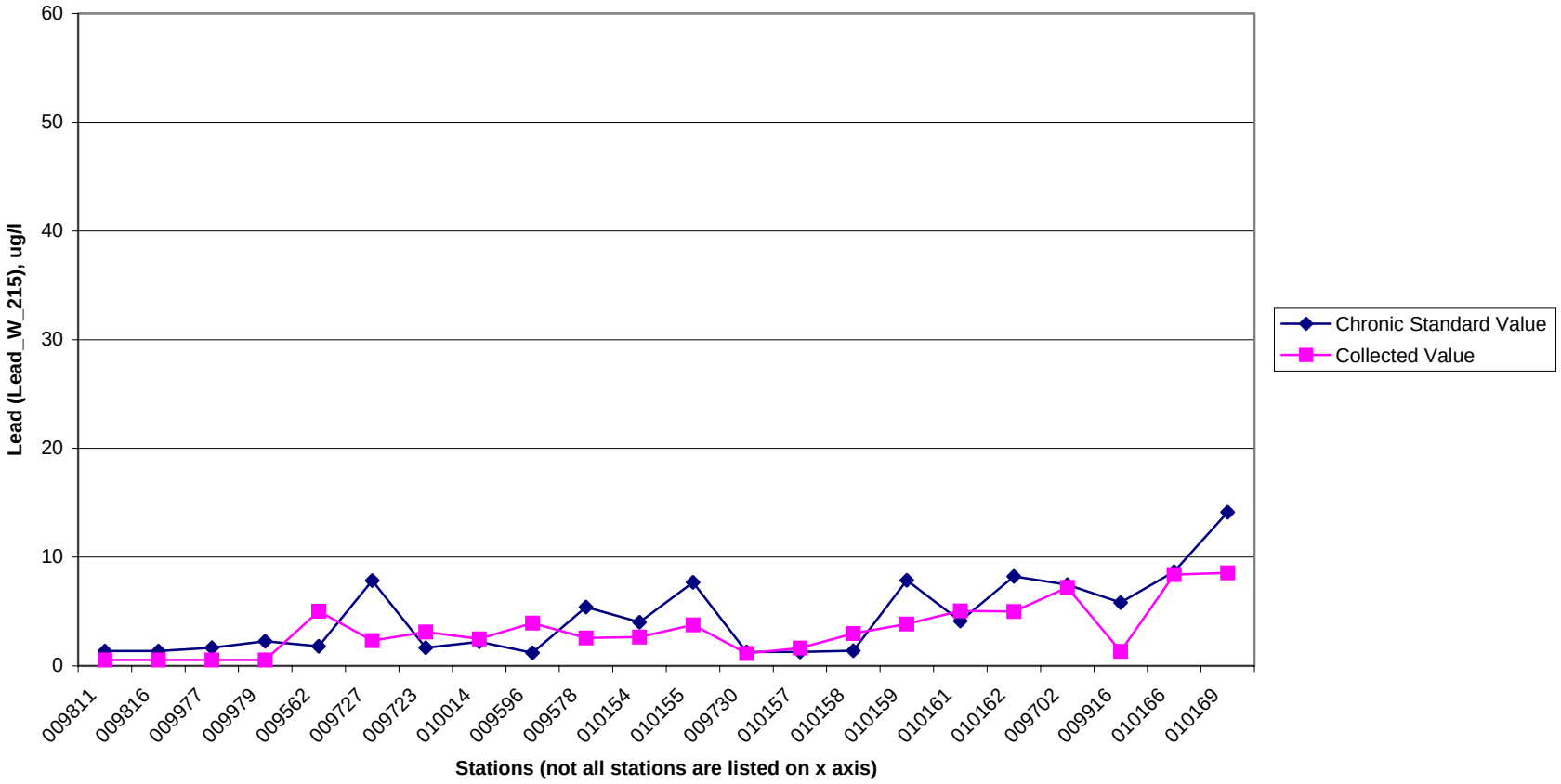


Figure 65. Lead In Nebraska Coldwater-B Reference Streams, 1997-2001 R-EMAP

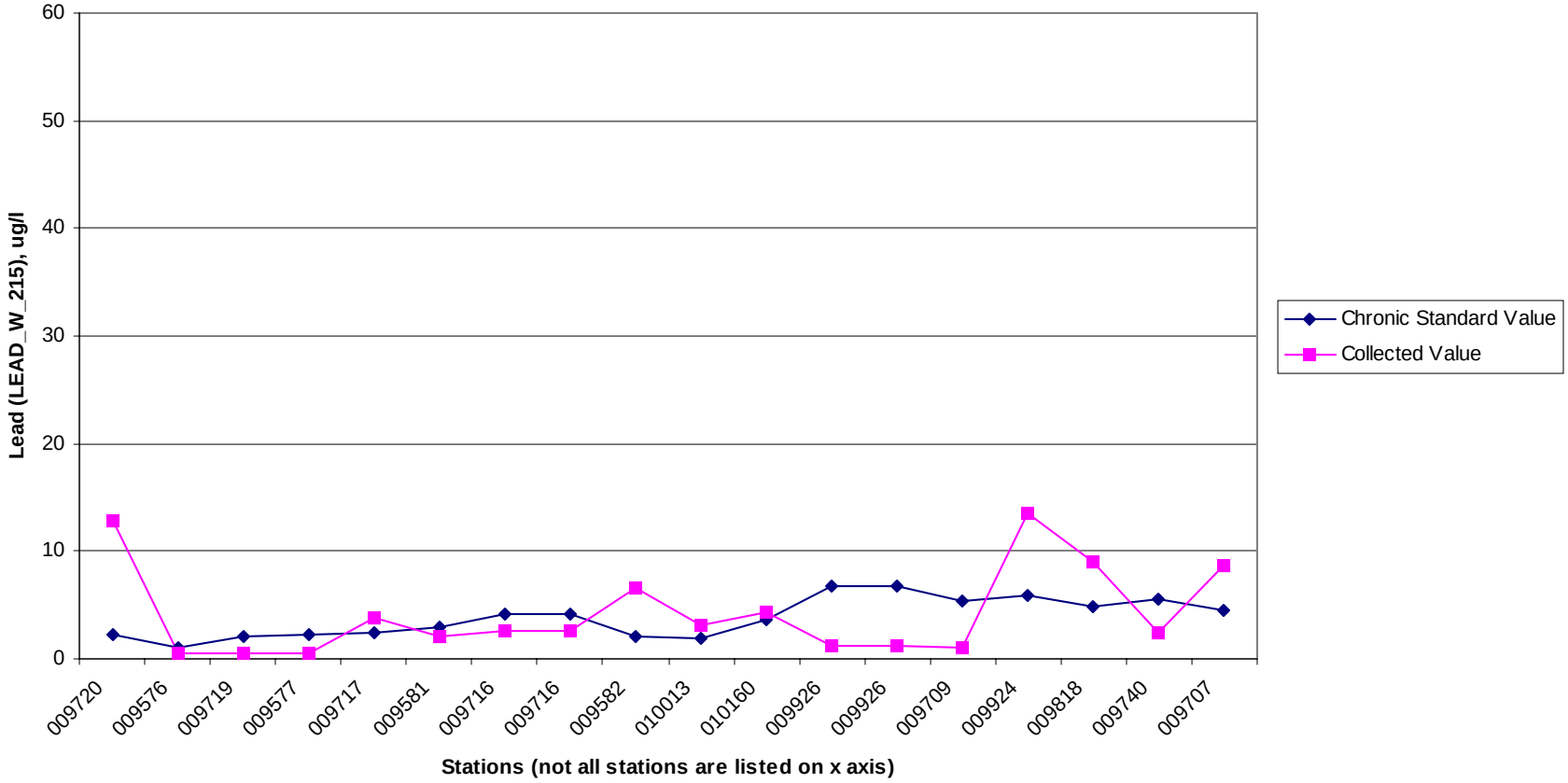


Figure 66. Lead In Nebraska Warmwater-A Perennial Streams, 1997-2001 R-EMAP

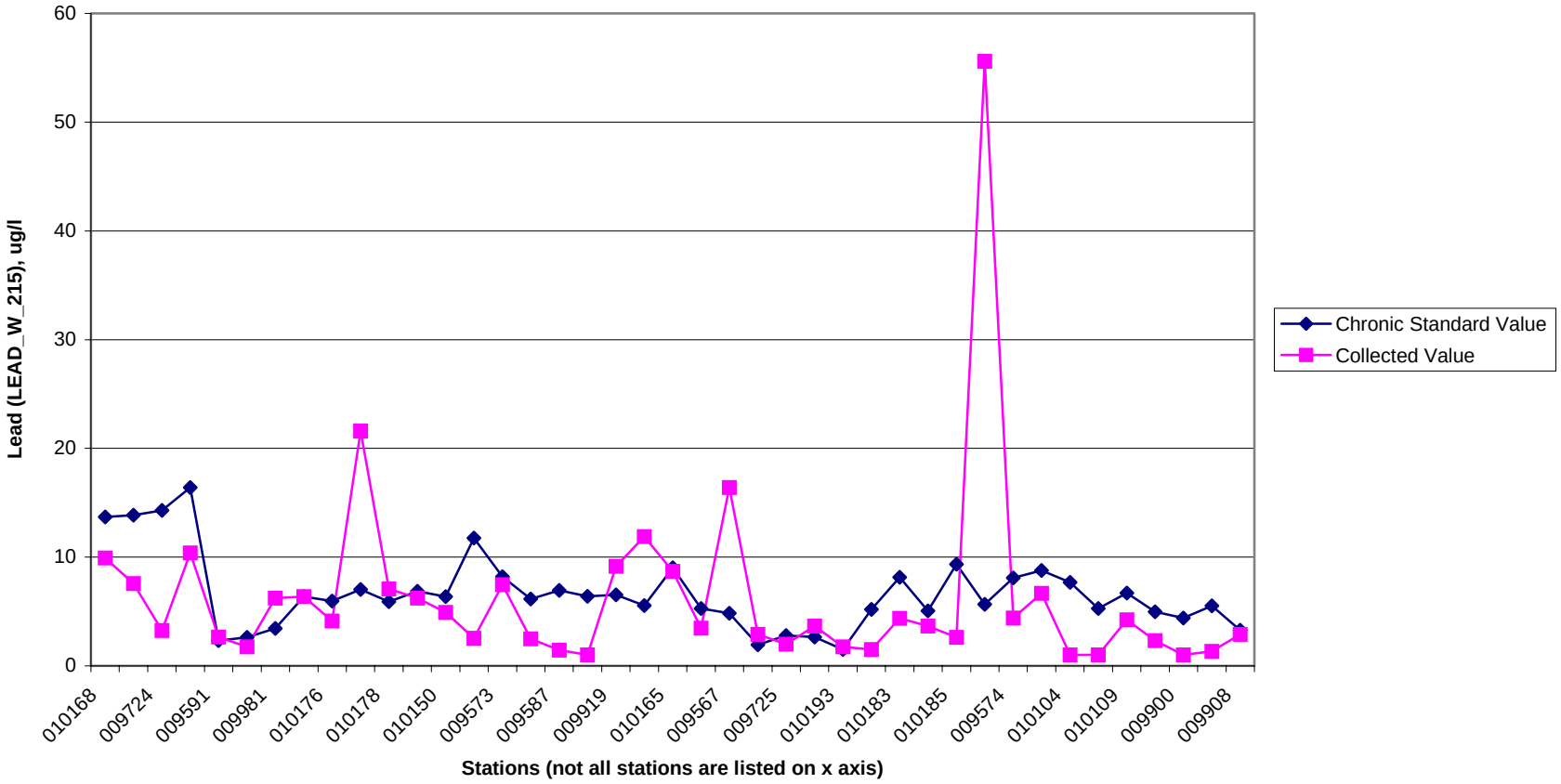


Figure 67. Lead In Nebraska Warmwater-A Reference Streams, 1997-2001 R-EMAP

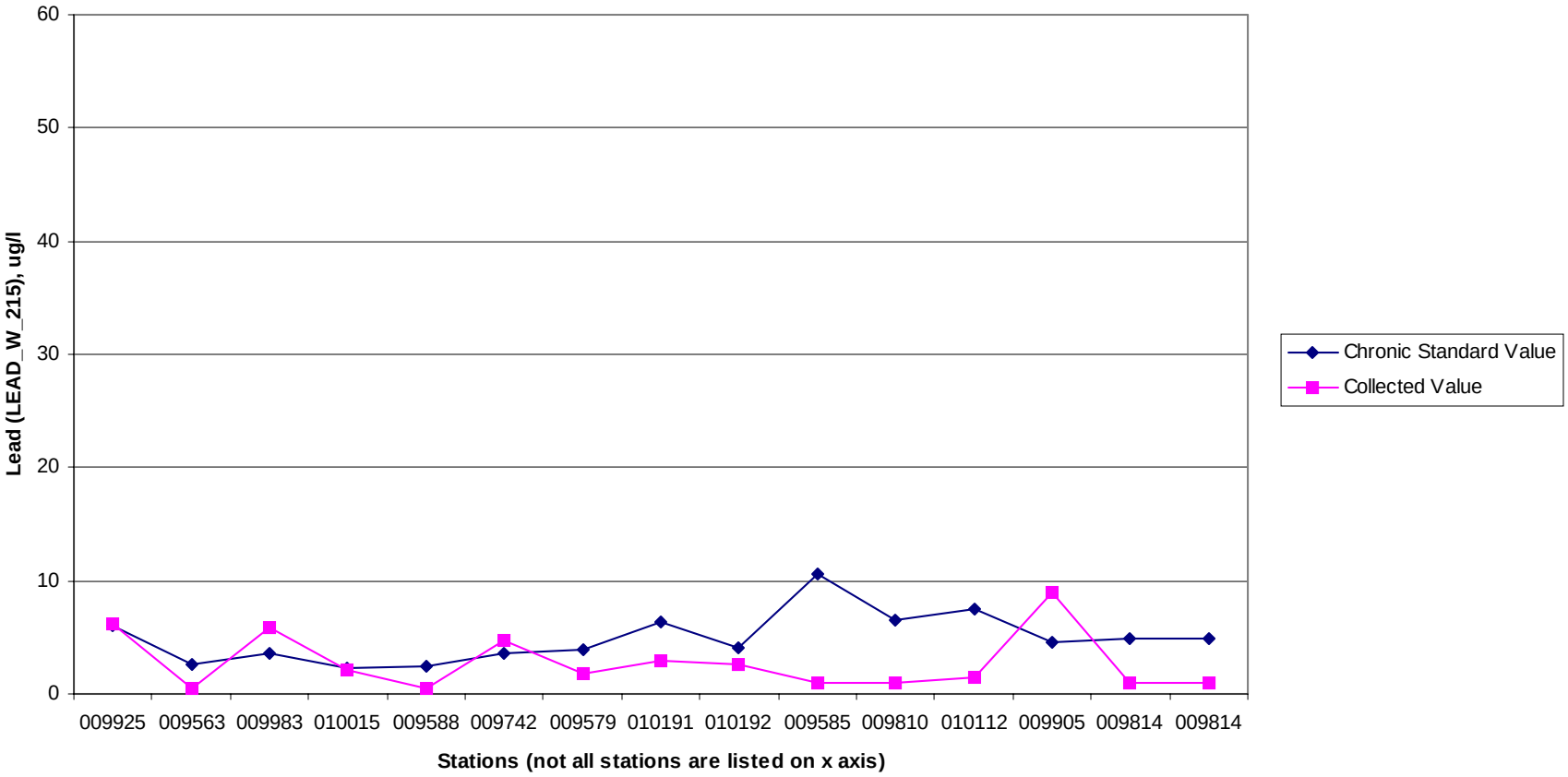


Figure 68. Lead In Nebraska Warmwater-B Perennial Streams, 1997-2001 R-EMAP

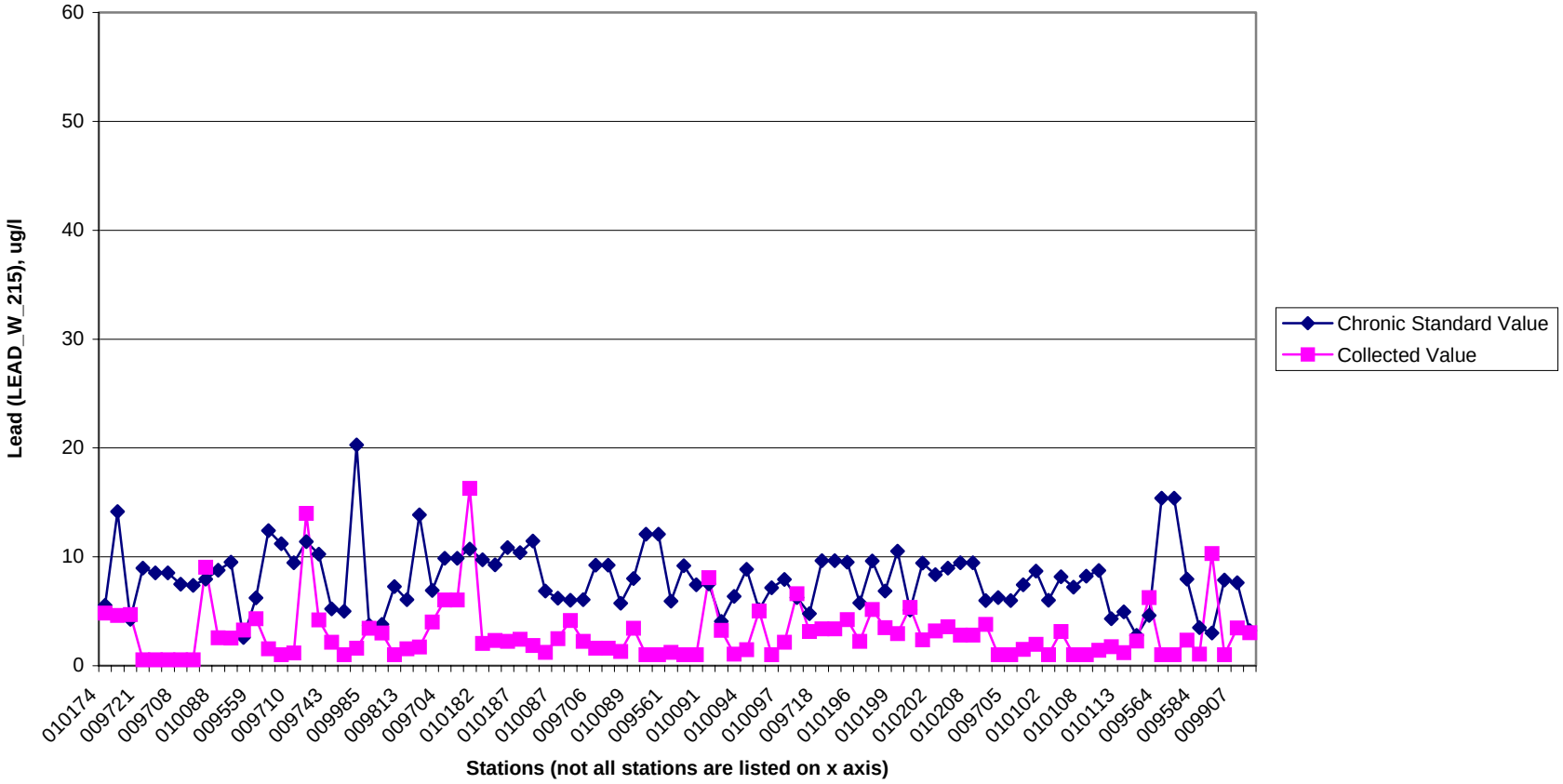


Figure 69. Lead In Nebraska Warmwater-B Reference Streams, 1997-2001 R-EMAP

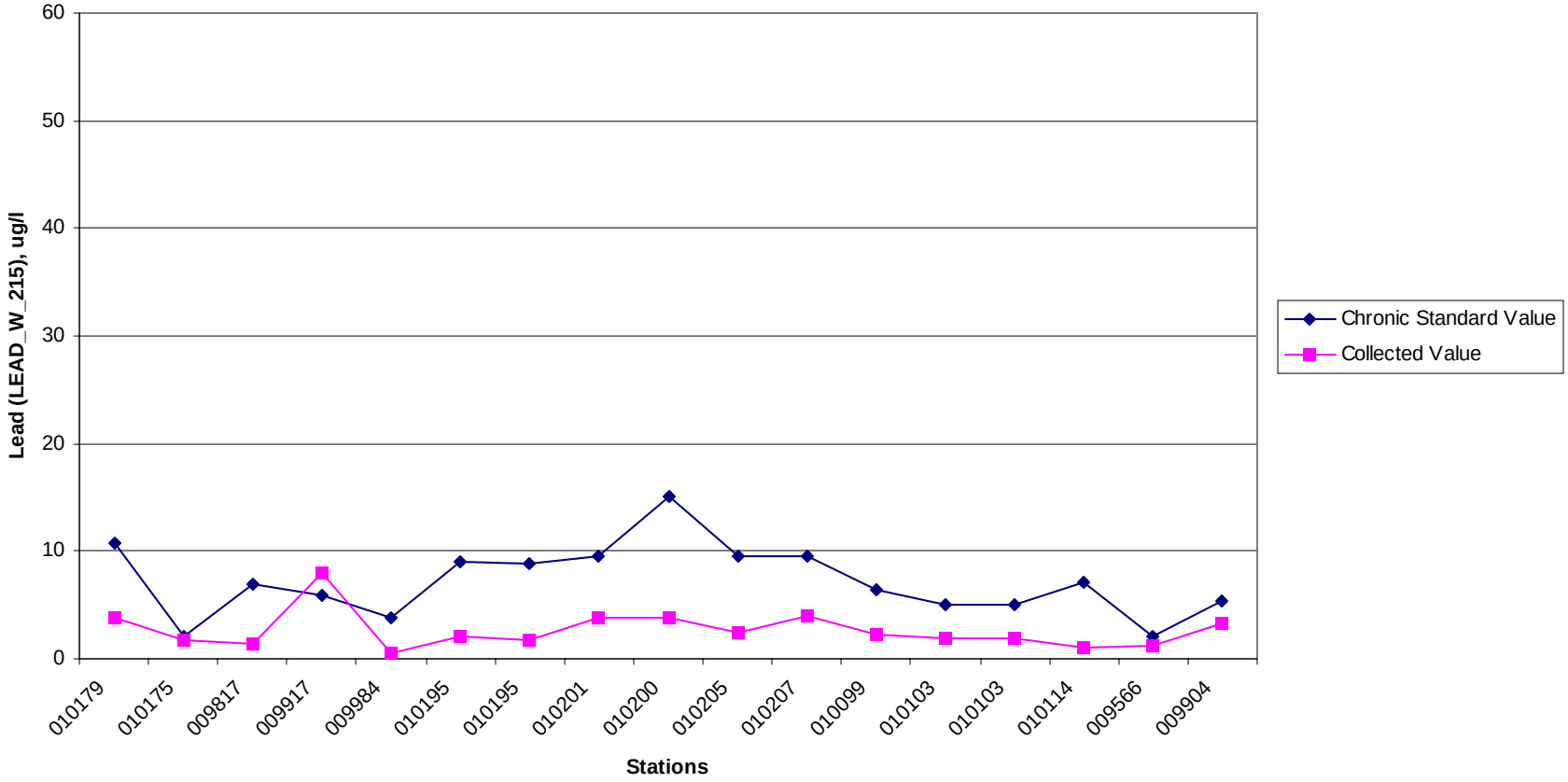


Figure 70. Selenium In Nebraska Perennial Streams, 1997-2001 R-EMAP

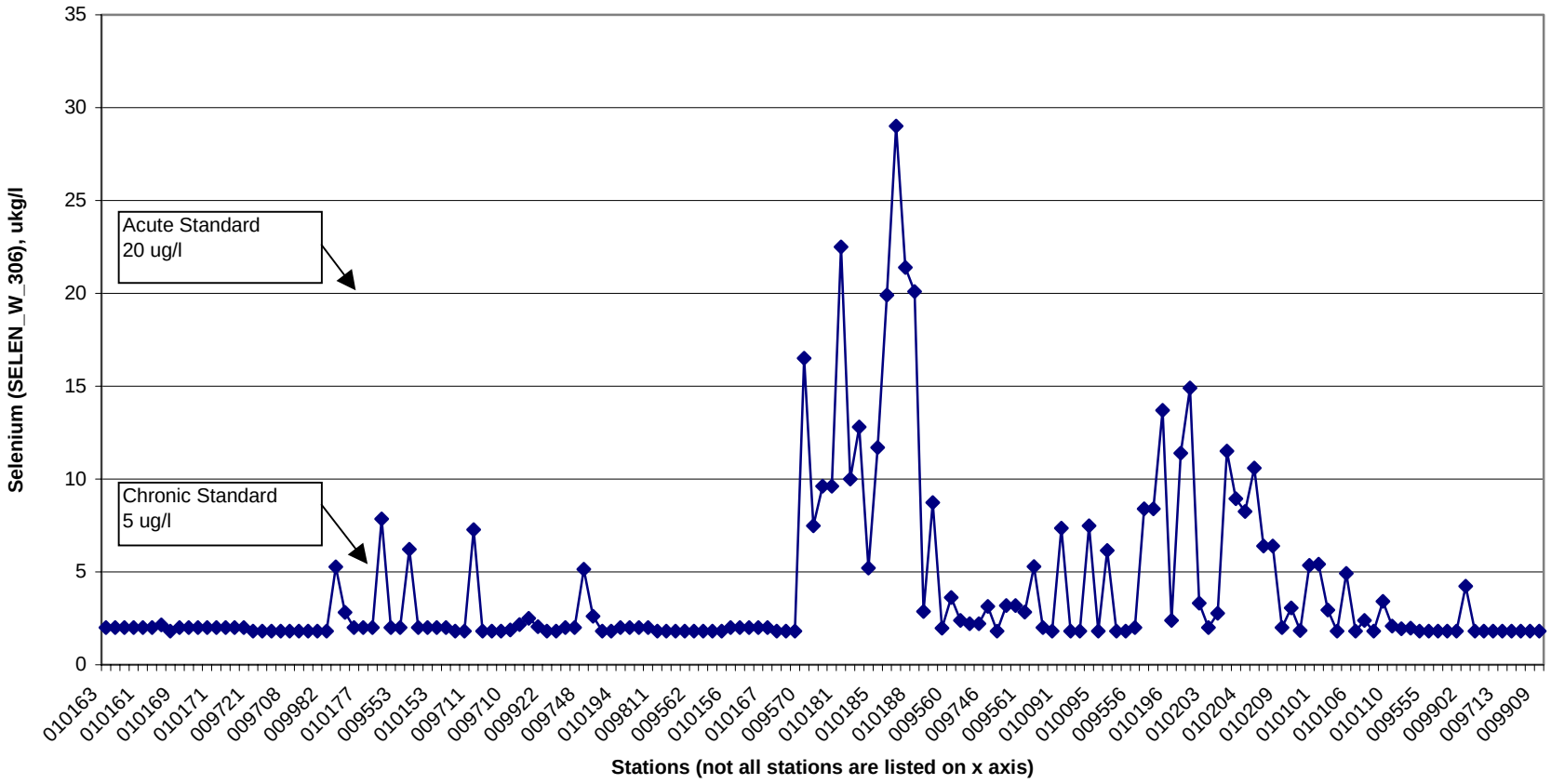


Figure 71. Selenium In Nebraska Reference Streams, 1997-2001 R-EMAP

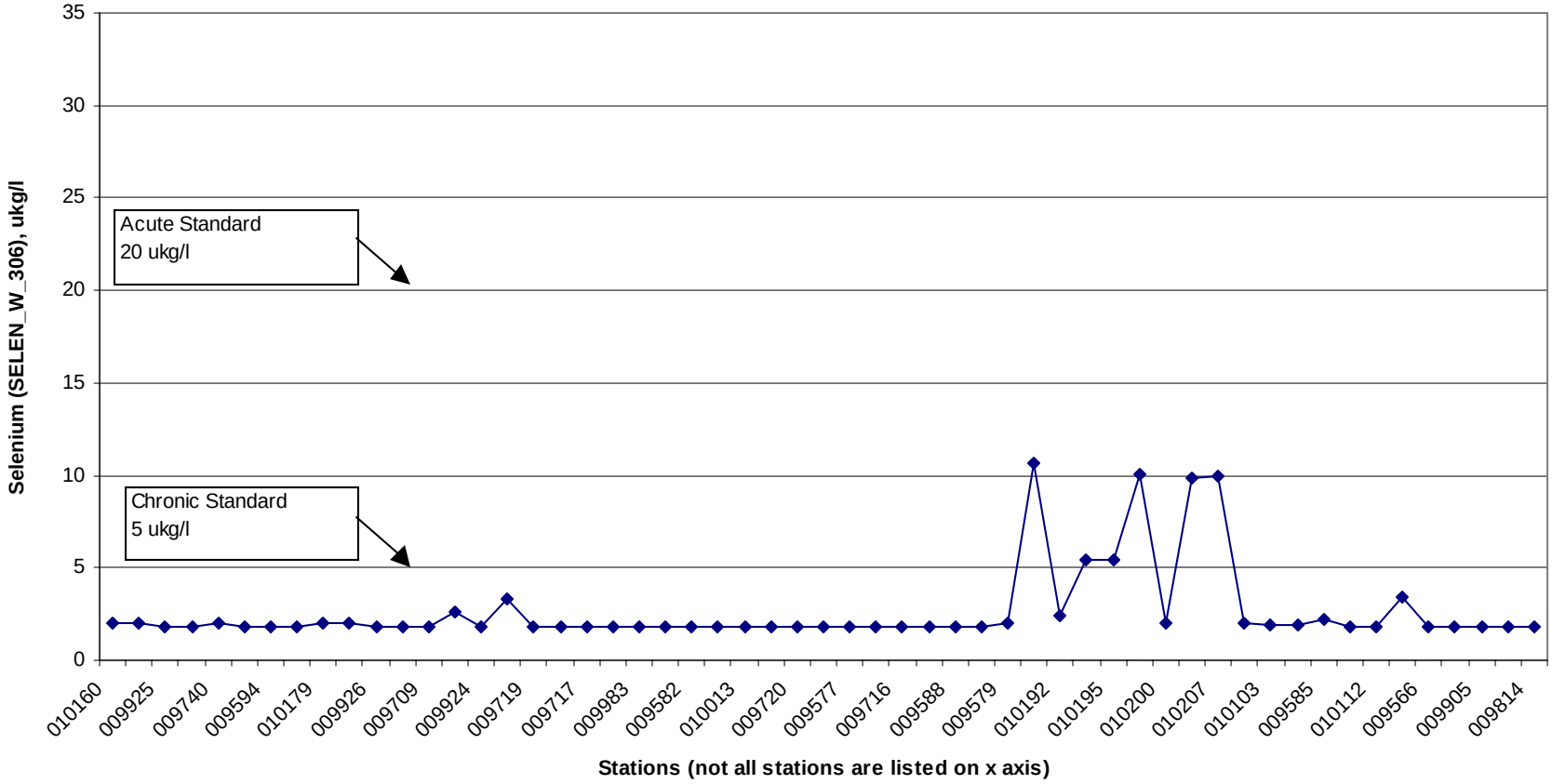


Table 72. Dissolved Selenium For All Nebraska Perennial Streams, 1997-2001 R-EMAP

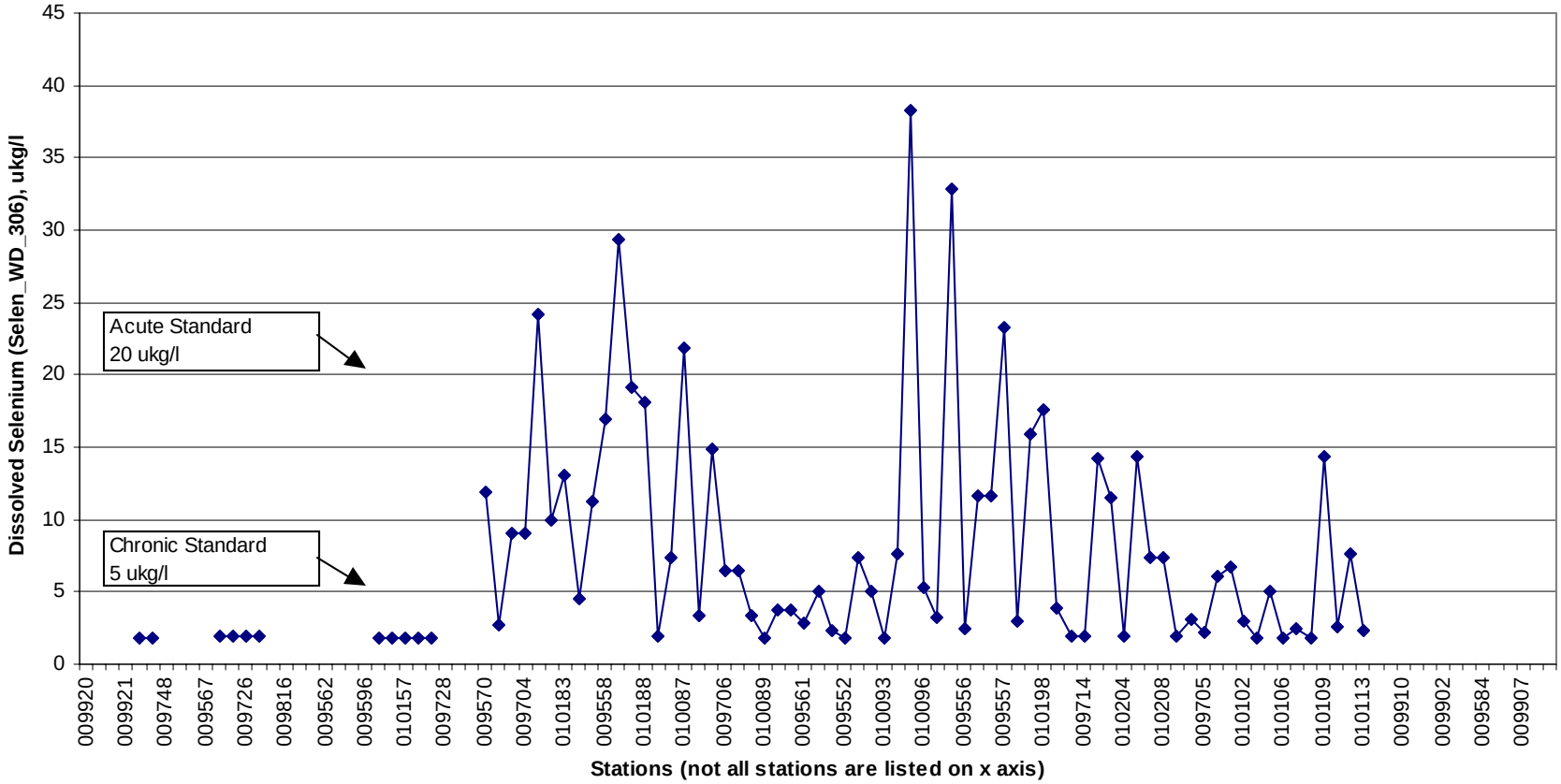


Figure 73. Dissolved Selenium For All Nebraska Reference Streams, 1997-2001 R-EMAP

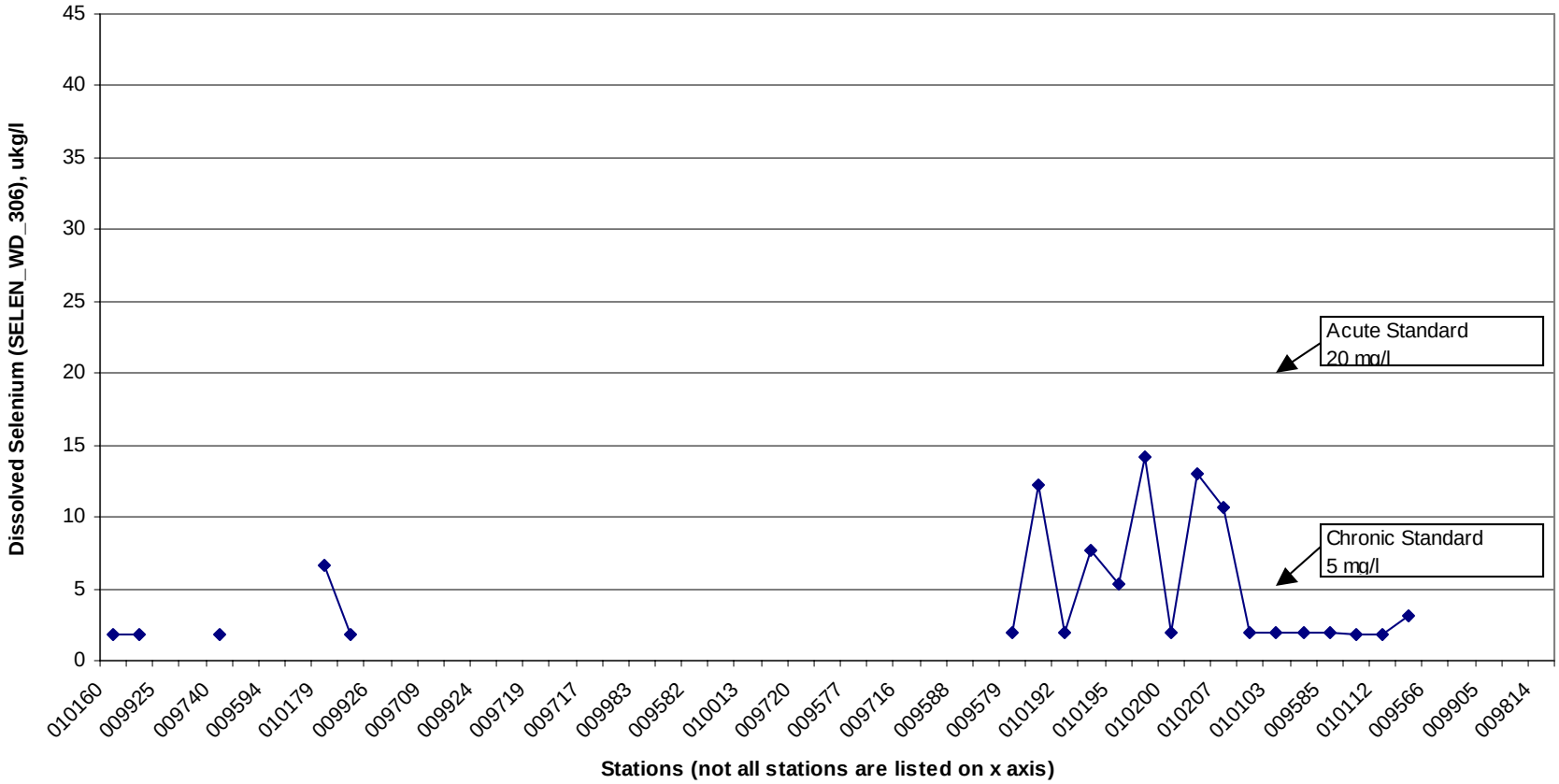


Figure 74. Chlorpyrfos (Dursban) In Nebraska Perennial Streams, 1997-2001 R-EMAP

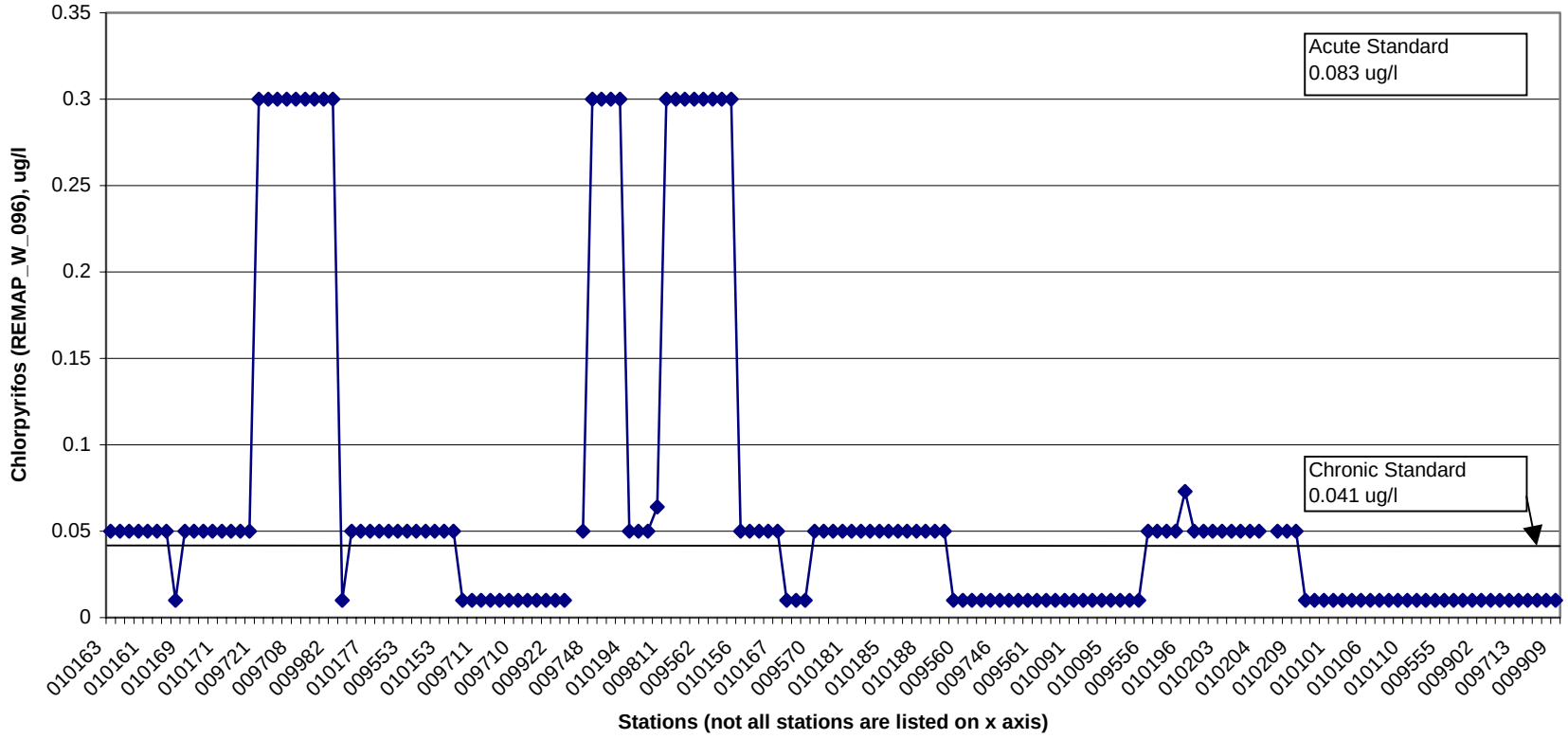


Figure 75. Chlorpyrifos (Dursban) In Nebraska Reference Streams, 1997-2001 R-EMAP

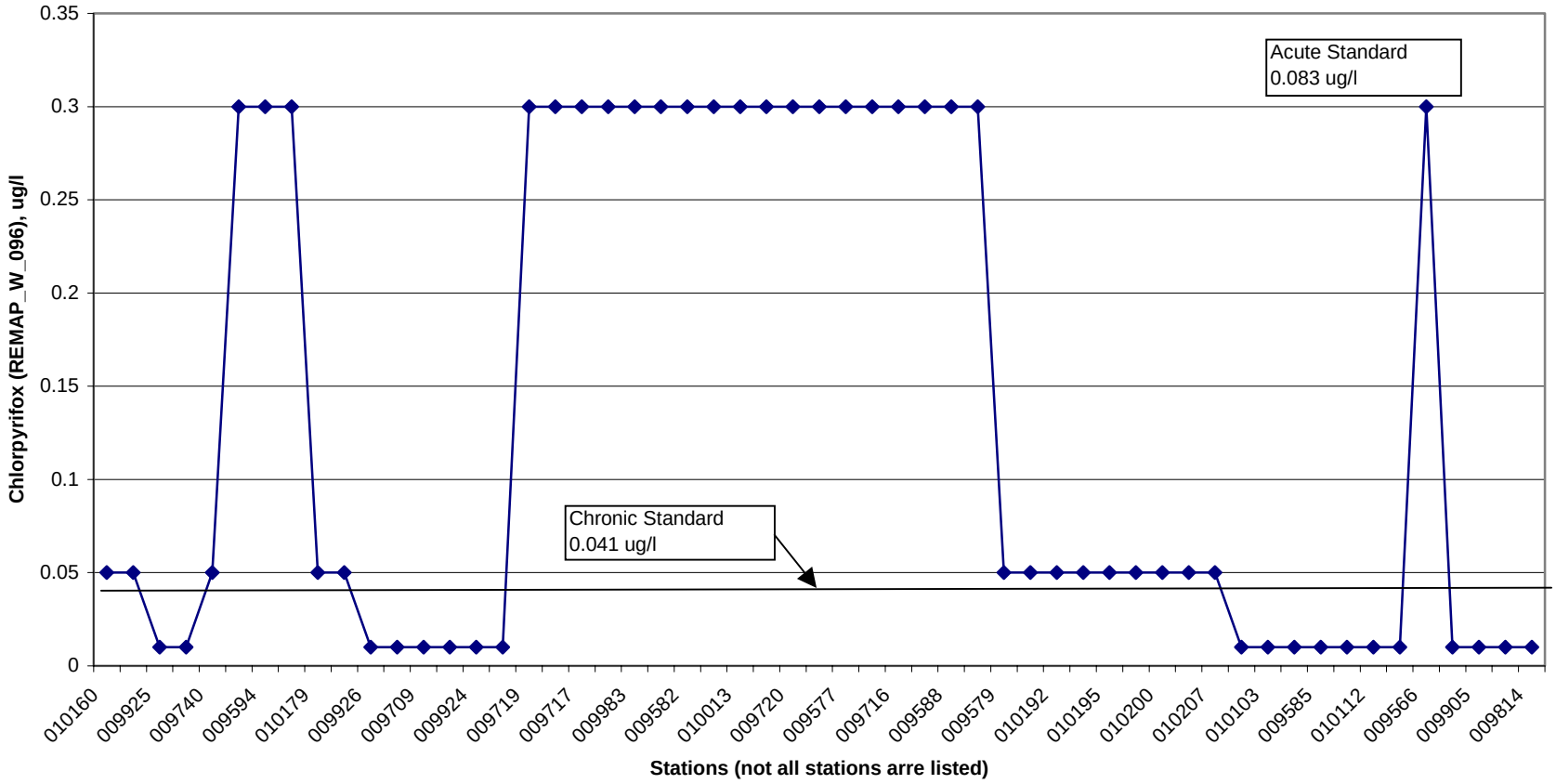
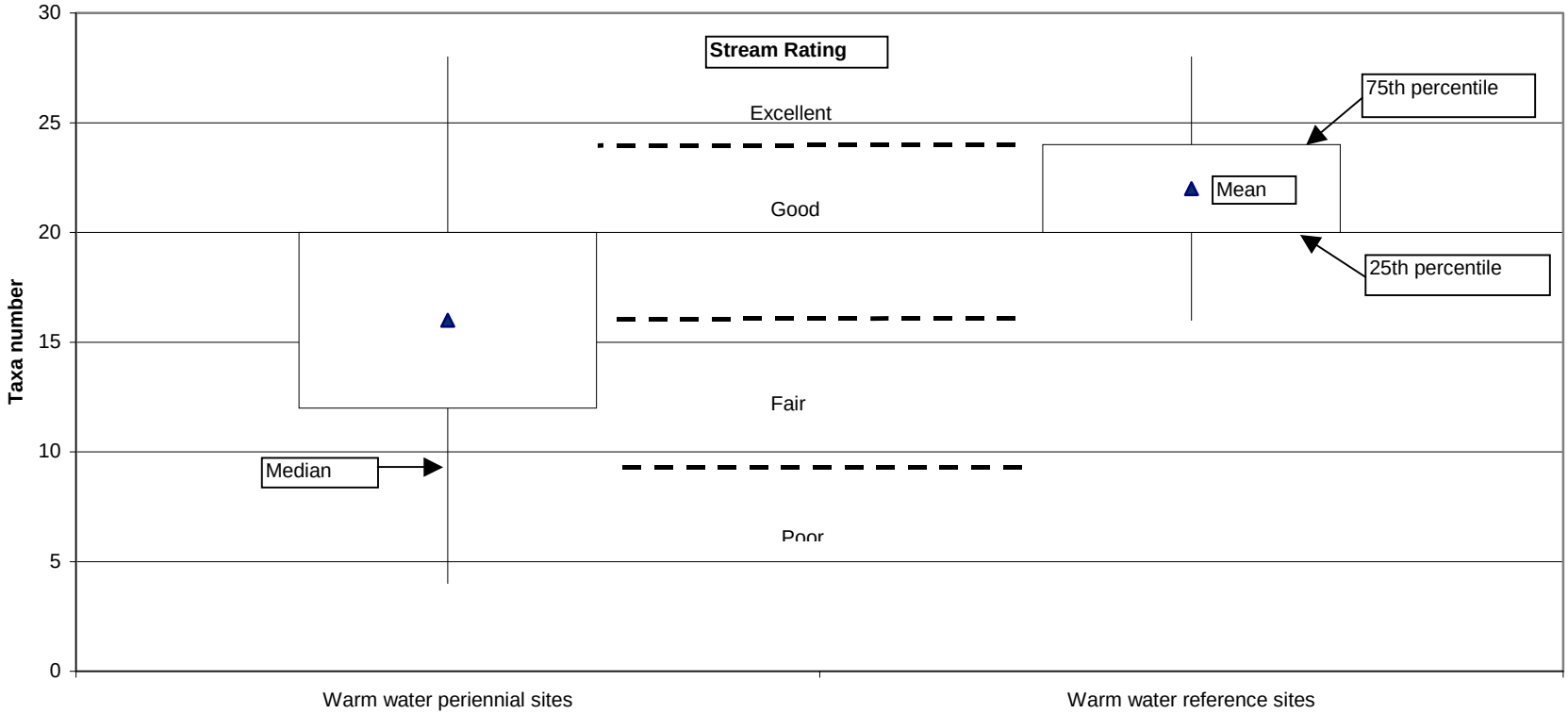
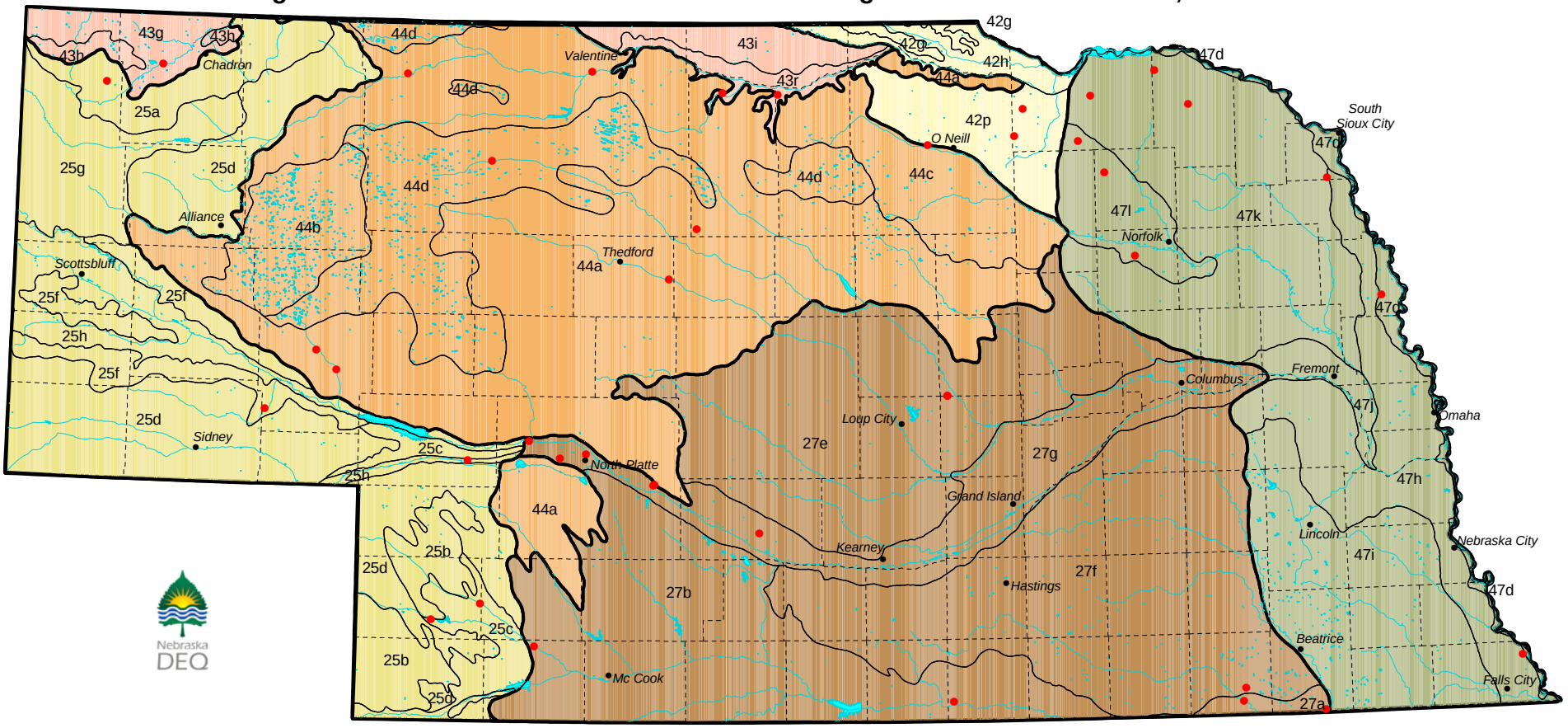


Figure 76. Example of stream rating system



Example groupings for perennial streams and reference streams

Figure 77: Distribution of "Excellent" Stream Ratings for REMAP in Nebraska, 1997-2001



Nebraska Ecoregions

25 - Western High Plains
- 25a - Pine Ridge Escarpment
- 25b - Rolling Sand Plains
- 25c - Moderate Relief Rangeland
- 25d - Flat to Rolling Cropland
- 25f - Scotts Bluff and Wildcat Hills
- 25g - Sandy and Silty Tablelands
- 25h - North and South Platte Valley and Terraces

27 - Central Great Plains
- 27a - Smoky Hills
- 27b - Rolling Plains and Breaks
- 27e - Central Nebraska Loess Plains
- 27f - Rainwater Basin Plains
- 27g - Platte River Valley

42 - Northwestern Glaciated Plains
- 42g - Ponca Plains
- 42h - Southern River Breaks
- 42p - Holt Tablelands

43 - Northwestern Great Plains
- 43g - Semiarid Pierre Shale Plains
- 43h - White River Badlands
- 43i - Keya Paha Tablelands
- 43r - Niobrara River Breaks

44 - Nebraska Sand Hills
- 44a - Sand Hills
- 44b - Alkaline Lakes Area
- 44c - Wet Meadow and Marsh Plain
- 44d - Lakes Area

47 - Western Corn Belt Plains
- 47d - Missouri Alluvial Plain
- 47h - Nebraska/Kansas Loess Hills
- 47i - Loess and Glacial Drift Hills
- 47j - Lower Platte Alluvial Plain
- 47k - Northeastern Nebraska Loess Hills
- 47l - Transitional Sandy Plain

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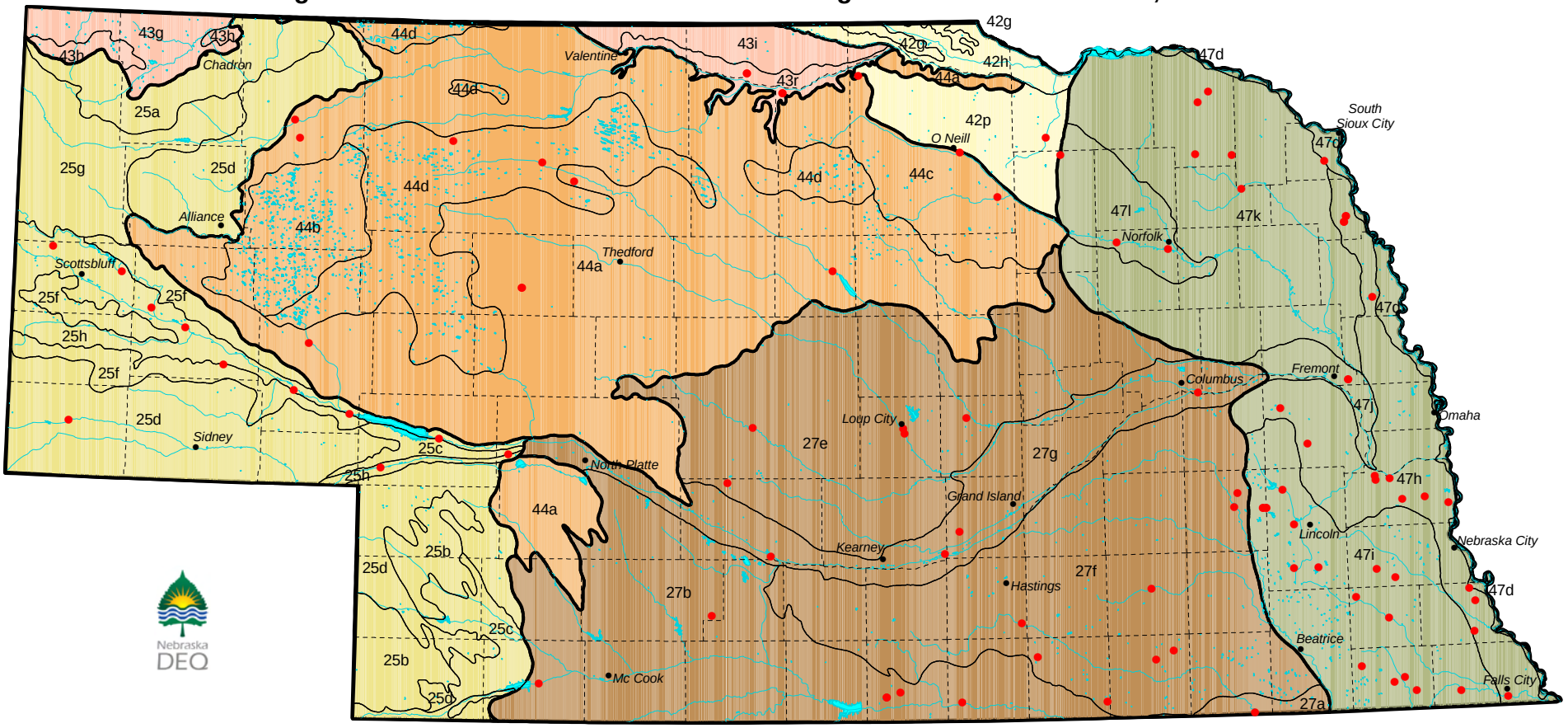
Figure 78: Distribution of "Good" Stream Ratings for REMAP in Nebraska, 1997-2001



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27 - Central Great Plains
- 27a - Smoky Hills
- 27b - Rolling Plains and Breaks
- 27e - Central Nebraska Loess Plains
- 27f - Rainwater Basin Plains
- 27g - Platte River Valley

42 - Northwestern Glaciated Plains
- 42g - Ponca Plains
- 42h - Southern River Breaks
- 42p - Holt Tablelands

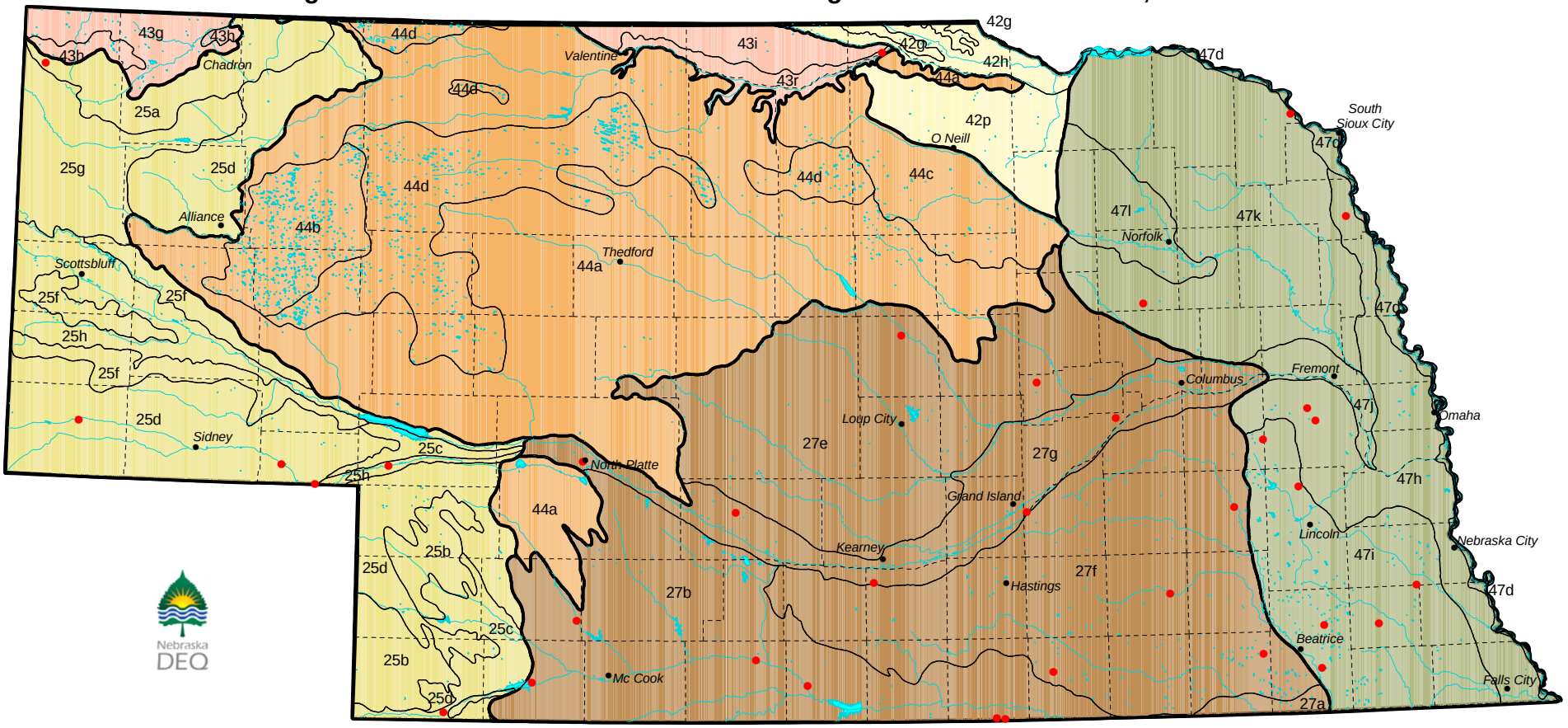
43 - Northwestern Great Plains
- 43g - Semiarid Pierre Shale Plains
- 43h - White River Badlands
- 43i - Keya Paha Tablelands
- 43r - Niobrara River Breaks

44 - Nebraska Sand Hills
- 44a - Sand Hills
- 44b - Alkaline Lakes Area
- 44c - Wet Meadow and Marsh Plain
- 44d - Lakes Area

47 - Western Corn Belt Plains
- 47d - Missouri Alluvial Plain
- 47h - Nebraska/Kansas Loess Hills
- 47i - Loess and Glacial Drift Hills
- 47j - Lower Platte Alluvial Plain
- 47k - Northeastern Nebraska Loess Hills
- 47l - Transitional Sandy Plain

July 2005

Figure 79: Distribution of "Fair" Stream Ratings for REMAP in Nebraska, 1997-2001



Nebraska DEQ

Nebraska Ecoregions

25 - Western High Plains
- 25a - Pine Ridge Escarpment
- 25b - Rolling Sand Plains
- 25c - Moderate Relief Rangeland
- 25d - Flat to Rolling Cropland
- 25f - Scotts Bluff and Wildcat Hills
- 25g - Sandy and Silty Tablelands
- 25h - North and South Platte Valley and Terraces

27 - Central Great Plains
- 27a - Smoky Hills
- 27b - Rolling Plains and Breaks
- 27e - Central Nebraska Loess Plains
- 27f - Rainwater Basin Plains
- 27g - Platte River Valley

42 - Northwestern Glaciated Plains
- 42g - Ponca Plains
- 42h - Southern River Breaks
- 42p - Holt Tablelands

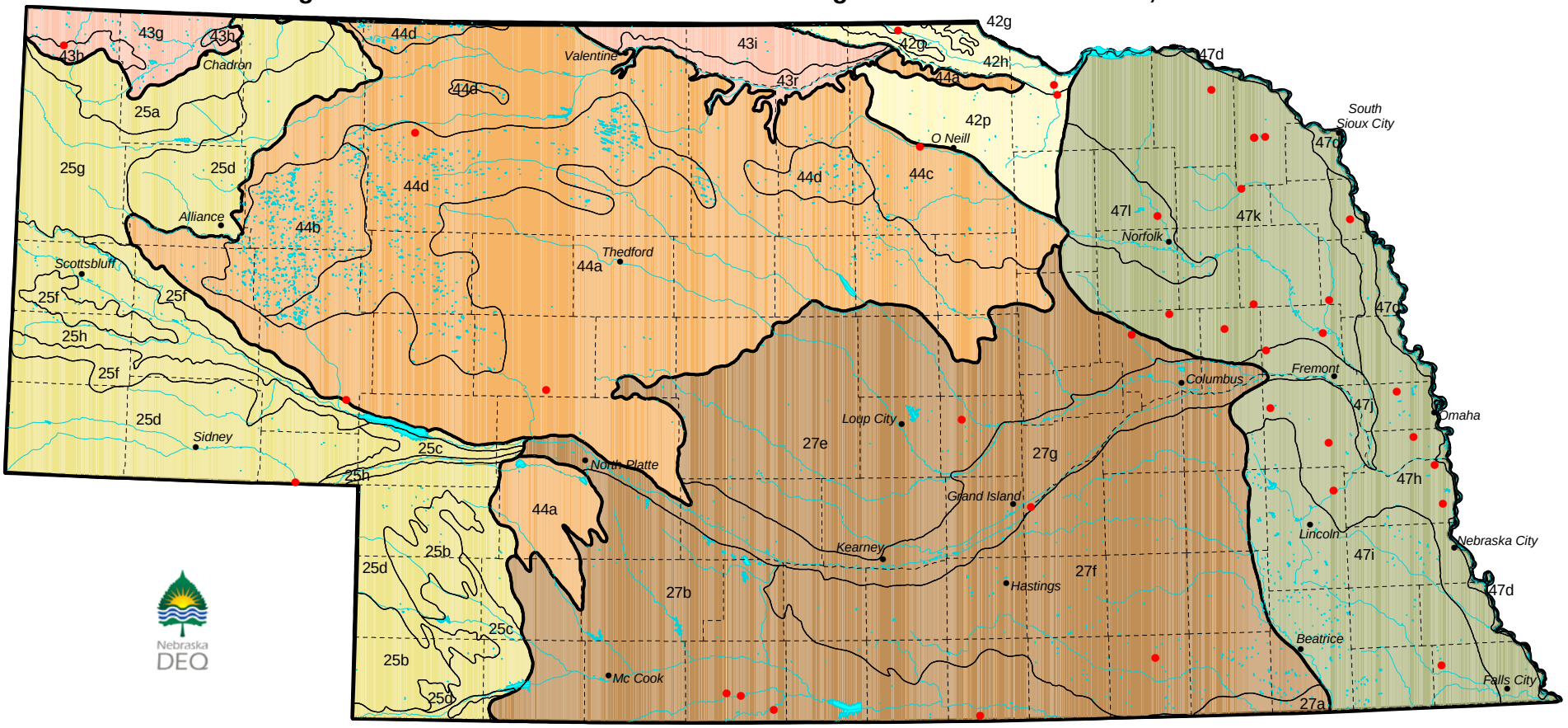
43 - Northwestern Great Plains
- 43g - Semiarid Pierre Shale Plains
- 43h - White River Badlands
- 43i - Keya Paha Tablelands
- 43r - Niobrara River Breaks

44 - Nebraska Sand Hills
- 44a - Sand Hills
- 44b - Alkaline Lakes Area
- 44c - Wet Meadow and Marsh Plain
- 44d - Lakes Area

47 - Western Corn Belt Plains
- 47d - Missouri Alluvial Plain
- 47h - Nebraska/Kansas Loess Hills
- 47i - Loess and Glacial Drift Hills
- 47j - Lower Platte Alluvial Plain
- 47k - Northeastern Nebraska Loess Hills
- 47l - Transitional Sandy Plain

July 2005

Figure 80: Distribution of "Poor" Stream Ratings for REMAP in Nebraska, 1997-2001



Nebraska Ecoregions

25 - Western High Plains
- 25a - Pine Ridge Escarpment
- 25b - Rolling Sand Plains
- 25c - Moderate Relief Rangeland
- 25d - Flat to Rolling Cropland
- 25f - Scotts Bluff and Wildcat Hills
- 25g - Sandy and Silty Tablelands
- 25h - North and South Platte Valley and Terraces

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- 27a - Smoky Hills
- 27b - Rolling Plains and Breaks
- 27e - Central Nebraska Loess Plains
- 27f - Rainwater Basin Plains
- 27g - Platte River Valley

42 - Northwestern Glaciated Plains
- 42g - Ponca Plains
- 42h - Southern River Breaks
- 42p - Holt Tablelands

43 - Northwestern Great Plains
- 43g - Semiarid Pierre Shale Plains
- 43h - White River Badlands
- 43i - Keya Paha Tablelands
- 43r - Niobrara River Breaks

44 - Nebraska Sand Hills
- 44a - Sand Hills
- 44b - Alkaline Lakes Area
- 44c - Wet Meadow and Marsh Plain
- 44d - Lakes Area

47 - Western Corn Belt Plains
- 47d - Missouri Alluvial Plain
- 47h - Nebraska/Kansas Loess Hills
- 47i - Loess and Glacial Drift Hills
- 47j - Lower Platte Alluvial Plain
- 47k - Northeastern Nebraska Loess Hills
- 47l - Transitional Sandy Plain

July 2005

Table 1. 1997-2001 Nebraska R-EMAP stations and geographic site data.

STORET	NDEQ_ID	STRMNAME	ORDER	ECOREG	REF/PERIENIAL	LAT_DD	LONG_DD	COUNTY	BASIN
000000	RE2162	BEAVER CREEK (C)	2	27	PER*	40.055394	100.397222	FURNAS	REPUBLICAN
009551	LP2160	NORTH OAK CREEK	2	47	PER	41.174765	96.916293	BUTLER	LOWER PLATTE
009552	LP2161	UNNAMED TRIB. LITTLE SALT CREEK	1	47	PER	40.968197	96.724432	LANCASTER	LOWER PLATTE
009553	MP2058	NORTH DRY CREEK	2	27	PER	40.596390	99.135320	KEARNEY	MIDDLE PLATTE
009554	RE2160	BEAVER CREEK (A)	2	27	PER	40.126119	99.964339	FURNAS	REPUBLICAN
009555	BB2100	TURKEY CREEK (A)	1	27	PER	40.525639	97.469100	FILLMORE	BIG BLUE
009556	MT1041	TEKAMAHA CREEK (B)	1	47	PER	41.766572	96.260475	BURT	MISSOURI TRIBS
009557	MT1131	PIGEON CREEK (A)	1	47	PER	42.359711	96.502842	DAKOTA	MISSOURI TRIBS
009558	EL2101	MIDDLE LOGAN CREEK	1	47	PER	42.408141	97.248990	CEDAR	ELKHORN
009559	RE1165	EAST PENNY CREEK	1	27	PER	40.022583	98.549056	WEBSTER	REPUBLICAN
009560	LP1153	PAWNEE CREEK	1	47	PER	40.981703	96.287152	CASS	LOWER PLATTE
009561	LP2158	COTTONWOOD CREEK	2	47	PER	41.306318	96.811078	SAUNDERS	LOWER PLATTE
009562	LO3171	MIDDLE LOUP RIVER (A)	3	44	PER	41.901697	100.294039	THOMAS	LOUP
009563	LO3170	MIDDLE LOUP RIVER (B)	3	27	REF	41.256750	98.957806	SHERMAN	LOUP
009564	BB4105	UNNAMED TRIB. TO BIG BLUE RIVER	1	27	REF	40.887556	97.092361	SEWARD	BIG BLUE
009565	NI2370	VERDIGRE CREEK (A)	4	42	REF	42.677389	98.040528	KNOX	NIOBRARA
009566	NI2365	UNNAMED TRIB. MERRIMAN CREEK	1	47	REF	42.419333	98.028722	ANTELOPE	NIOBRARA
009567	WH1065	WHITE RIVER	3	43	PER	42.782175	103.242864	DAWES	WHITE
009569	EL1094	UNION CREEK	1	47	PER	41.773655	97.574032	MADISON	ELKHORN
009570	EL1093	TRACY CREEK	1	47	PER	41.724995	97.426986	PLATTE	ELKHORN
009573	MP2060	SPRING CREEK	1	27	PER	40.902240	99.913460	DAWSON	MIDDLE PLATTE
009574	LP2159	WAHOO CREEK	3	47	PER	41.149348	96.543594	SAUNDERS	LOWER PLATTE
009576	LO2145	BIG CREEK	2	44	REF	42.317833	100.844139	CHERRY	LOUP
009577	LO3165	N. FORK DISMAL RIVER (A)	1	44	REF	41.860306	101.137778	HOOKER	LOUP
009578	NP1100	NORTH PLATTE RIVER	5	27	PER	41.205030	101.086100	LINCOLN	NORTH PLATTE
009579	EL4107	ELKHORN RIVER (A)	3	47	PER	42.037666	97.717841	MADISON	ELKHORN
009580	MP1050	PLATTE RIVER (SIDE CHANNEL)	5	27	PER	41.383906	97.276267	PLATTE	MIDDLE PLATTE
009581	NI2385	MIDDLE BRANCH VERDIGRE CREEK	3	42	REF	42.505167	98.295167	KNOX	NIOBRARA
009582	NI3405	LONG PINE CREEK	3	43	REF	42.692500	99.664444	ROCK	NIOBRARA
009583	LP11154	FOUR MILE CREEK	3	47	PER	41.034668	95.949226	CASS	LOWER PLATTE

Table 1. continued

STORET	NDEQ_ID	STRMNAME	ORDER	ECOREG	REF/PERIENIAL	LAT_DD	LONG_DD	COUNTY	BASIN
009584	LB2090	BIG SANDY CREEK (A)	2	27	PER	40.244000	97.557794	THAYER	LITTLE BLUE
009585	NE2183	RATTLESNAKE CREEK	2	47	REF	40.065816	95.859694	RICHARDSON	NEMAHA
009587	RE1150	REPUBLICAN RIVER (A)	4	27	REF	40.080333	98.647583	WEBSTER	REPUBLICAN
009588	NI4392	NIOBRARA RIVER (C)	2	44	REF	42.772014	101.816750	CHERRY	NIOBRARA
009591	LO2037	TURTLE CREEK	2	27	PER	41.658139	98.963806	VALLEY	LOUP
009594	WH2049	MONROE CREEK	1	25	REF	42.767236	103.927531	SIOUX	HAT CREEK
009595	WH1037	MIDDLE FORK SOLDIER CREEK	1	25	REF	42.698189	103.567986	SIOUX	WHITE
009596	NI4305	PINE CREEK	1	44	PER	42.485861	102.435583	SHERIDAN	NIOBRARA
009702	NP3113	DRY SPOTTEDTAIL CREEK		25	PER	41.981840	103.837300	SCOTTSBLUFF	NORTH PLATTE
009703	NE1177	ERVINE CREEK	1	47	PER	40.864870	95.912327	CASS	NEMAHA
009704	EL1095	FREMONT STORM DRAINAGE CANAL	1	47	PER	41.419108	96.419097	DODGE	ELKHORN
009705	NE1178	DUCK CREEK	1	47	PER	40.500317	95.785667	NEMAHA	NEMAHA
009706	LP1155	UNNAMED TRIB. MIDDLE CREEK	1	47	PER	40.879766	96.910580	LANCASTER	LOWER PLATTE
009707	WH2070	WARBONNET CREEK	2	43	PER	42.842317	103.828069	SIOUX	HAT CREEK
009708	LO2160	MUNSON CREEK (A)	1	27	PER	41.298694	98.599806	HOWARD	LOUP
009709	RE1170	CENTER CREEK	1	27	REF	40.125942	98.991969	FRANKLIN	REPUBLICAN
009710	RE2161	BEAVER CREEK (B)	2	27	PER	40.115817	99.884511	FURNAS	REPUBLICAN
009711	RE1175	HICKS CREEK	1	27	PER	40.010194	98.456000	WEBSTER	REPUBLICAN
009712	LB2095	LIBERTY CREEK	1	27	PER	40.266500	98.219886	NUCKOLLS	LITTLE BLUE
009713	LB2091	BIG SANDY CREEK (B)	2	27	PER	40.250794	97.562144	THAYER	LITTLE BLUE
009714	MT2138	UNNAMED TRIB. SOUTH CREEK	1	47	PER	42.471297	96.840469	DIXON	MISSOURI TRIBS
009715	NI3410	SHORT PINE CREEK	1	43	REF	42.698556	99.638139	ROCK	NIOBRARA
009716	NI3400	UNNAMED TRIB. ROCK CREEK	1	43	REF	42.786528	99.844861	KEYAPAHA	NIOBRARA
009717	NI2380	N. BRANCH VERDIGRE CREEK	2	42	REF	42.619722	98.241944	KNOX	NIOBRARA
009718	MT1130	UNNAMED TRIB. BLACKBIRD CREEK (B)	1	47	PER	42.117232	96.392053	THURSTON	MISSOURI TRIBS
009719	LO2150	NORTH LOUP RIVER (A)	2	42	REF	42.771861	99.196944	GARFIELD	LOUP
009720	LO2140	GOOSE CREEK	1	44	REF	42.117017	100.135747	BROWN	LOUP
009721	LO1130	S. BRANCH TIMBER CREEK	1	27	PER	41.444092	98.194361	NANCE	LOUP
009723	NI3395	GORDON CREEK	2	44	PER	42.486361	101.546417	CHERRY	NIOBRARA
009724	SP1037	SOUTH PLATTE RIVER	4	25	PER	41.079200	101.928100	KEITH	SOUTH PLATTE

Table 1. continued

STORET	NDEQ_ID	STRMNAME	ORDER	ECOREG	REF/PERIENIAL	LAT_DD	LONG_DD	COUNTY	BASIN
009725	EL4109	ELKHORN RIVER (B)	2	44	PER	42.436256	98.612544	HOLT	ELKHORN
009726	EL4110	ELKHORN RIVER (C)	2	44	PER	42.469734	98.797496	HOLT	ELKHORN
009727	MT2139	HOWE CREEK	2	47	REF	42.671113	97.847821	KNOX	MISSOURI TRIBS
009728	BB1110	WOLF CREEK	1	47	PER	40.183861	96.409069	PAWNEE	BIG BLUE
009729	RE2151	REPUBLICAN RIVER (B)	4	27	PER	40.155919	99.511303	HARLAN	REPUBLICAN
009730	NP2104	BLUE CREEK	1	44	PER	41.603750	102.351600	GARDEN	NORTH PLATTE
009738	LO2155	DAVIS CREEK	2	27	PER	41.394139	98.704444	GREELEY	LOUP
009740	SP2042	LODGEPOLE CREEK	2	25	REF	41.240940	103.706600	KIMBALL	SOUTH PLATTE
009742	NI4393	NIOBRARA RIVER (B)	2	44	REF	42.562389	102.467333	SHERIDAN	NIOBRARA
009743	RE3152	REPUBLICAN RIVER (C)	4	27	PER	40.165569	101.014928	HITCHCOCK	REPUBLICAN
009746	LP1157	DECKER CREEK	1	47	PER	40.986181	96.206075	CASS	LOWER PLATTE
009748	NI1238	UNNAMED TRIB. PONCA CREEK	1	42	REF	42.966083	98.960694	BOYD	NIOBRARA
009810	NE2185	LORES BRANCH	1	47	REF	40.073176	96.106752	PAWNEE	NEMAHA
009811	LO2085	NORTH LOUP RIVER (B)	2	44	PER	42.398139	101.029611	CHERRY	LOUP
009813	BB1115	BEAR CREEK	1	47	PER	40.370306	96.608333	GAGE	BIG BLUE
009814	LB2115	ROCK CREEK	1	27	REF	40.110667	97.058083	JEFFERSON	LITTLE BLUE
009816	LO2135	CALAMUS RIVER	3	44	PER	41.935583	99.354194	LOUP	LOUP
009817	RE1181	FARMERS CREEK	1	27	REF	40.083444	98.694250	WEBSTER	REPUBLICAN
009818	RE3185	FRENCHMAN CREEK (B)	2	25	REF	40.432417	101.625694	CHASE	REPUBLICAN
009900	LB1002	COON CREEK	1	27	REF	40.055833	97.074194	JEFFERSON	LITTLE BLUE
009901	BB1120	CUB CREEK	1	27	PER	40.254556	96.955778	JEFFERSON	BIG BLUE
009902	BB4125	PLUM CREEK	2	27	PER	40.949472	97.069722	SEWARD	BIG BLUE
009903	BB1130	MUD CREEK	2	47	PER	40.186833	96.631639	GAGE	BIG BLUE
009904	BB1003	SPRING CREEK (BB)	1	27	REF	40.006472	96.616192	GAGE	BIG BLUE
009905	LB2080	LITTLE BLUE RIVER (B)	2	27	REF	40.413972	98.305806	ADAMS	LITTLE BLUE
009906	LB1081	LITTLE BLUE RIVER (A)	3	27	PER	40.003250	97.014056	JEFFERSON	LITTLE BLUE
009907	LB2100	ELK CREEK	1	27	PER	40.202567	98.134283	NUCKOLLS	LITTLE BLUE
009908	LB2105	SPRING CREEK (LB)	1	27	PER	40.071444	97.834972	NUCKOLLS	LITTLE BLUE
009909	LB2110	DRY SANDY CREEK	1	27	PER	40.282306	97.457806	THAYER	LITTLE BLUE
009910	BB2101	TURKEY CREEK (B)	1	27	PER	40.550125	97.572750	FILLMORE	BIG BLUE

Table 1. continued

STORET	NDEQ_ID	STRMNAME	ORDER	ECOREG	REF/PERIENIAL	LAT_DD	LONG_DD	COUNTY	BASIN
009916	RE3190	SPRING CREEK (RE)	1	25	PER	40.505125	101.349461	CHASE	REPUBLICAN
009917	RE2195	MUDDY CREEK	1	27	REF	40.459172	100.047439	FRONTIER	REPUBLICAN
009918	RE2200	SAPPA CREEK	3	27	PER	40.056411	99.701061	FURNAS	REPUBLICAN
009919	RE2153	REPUBLICAN RIVER (D)	4	27	PER	40.265969	99.799519	FURNAS	REPUBLICAN
009920	RE2205	PRAIRIE DOG CREEK	1	27	PER	40.006306	98.408389	HARLAN	REPUBLICAN
009921	RE3210	RED WILLOW CREEK	1	27	PER	40.433967	100.807208	HAYES	REPUBLICAN
009922	RE3154	REPUBLICAN RIVER (E)	3	27	PER	40.168183	101.053033	HITCHCOCK	REPUBLICAN
009924	RE3094	FRENCHMAN CREEK (A)	4	27	REF	40.322967	101.043289	DUNDY	REPUBLICAN
009925	RE3113	REPUBLICAN RIVER (F)	4	25	REF	40.033317	101.545089	DUNDY	REPUBLICAN
009926	RE1040	COTTONWOOD CREEK	1	27	REF	40.104639	99.069694	FRANKLIN	REPUBLICAN
009977	LO2151	NORTH LOUP RIVER (C)	1	44	PER	42.403694	101.321889	CHERRY	LOUP
009978	LO2161	MUNSON CREEK (B)	1	27	REF	41.291861	98.624611	HOWARD	LOUP
009979	LO3166	N. FORK DISMAL RIVER (B)	1	44	PER	41.861639	101.139750	HOOKER	LOUP
009980	LO3172	MIDDLE LOUP RIVER (C)	3	27	PER	41.234778	98.950750	SHERMAN	LOUP
009981	LO4175	SOUTH LOUP RIVER	2	27	PER	41.265083	99.814444	CUSTER	LOUP
009982	LO4180	MUD CREEK	2	27	PER	41.027333	99.959011	BUFFALO	LOUP
009983	NI2390	NIOBRARA RIVER (E)	4	42	REF	42.718861	98.056444	KNOX	NIOBRARA
009984	NI2371	VERDIGRE CREEK (B)	3	42	REF	42.495250	98.113472	KNOX	NIOBRARA
009985	NI3415	UNNAMED TRIB. NIOBRARA RIVER	1	43	PER	42.870972	99.054806	BOYD	NIOBRARA
010013	NI3420	PLUM CREEK	3	43	PER	42.700833	99.986406	BROWN	NIOBRARA
010014	NI3425	WILLOW CREEK	1	44	PER	42.516583	101.769278	CHERRY	NIOBRARA
010015	NI3391	NIOBRARA RIVER (D)	3	44	REF	42.790917	100.744944	CHERRY	NIOBRARA
010087	LP1023	PAWNEE CREEK	2	47	PER	41.000045	96.290683	CASS	LOWER PLATTE
010088	LP1156	SHELL CREEK	2	27	PER	41.640842	97.645313	PLATTE	LOWER PLATTE
010089	LP2062	SALT CREEK	4	47	PER	40.943248	96.526537	LANCASTER	LOWER PLATTE
010090	LP2088	MIDDLE CREEK	1	47	PER	40.878532	96.929917	SEWARD	LOWER PLATTE
010091	LP2162	SAND CREEK	2	47	PER	41.245977	96.613998	SAUNDERS	LOWER PLATTE
010092	LP2163	OAK CREEK	2	47	PER	40.955006	96.815547	LANCASTER	LOWER PLATTE
010093	LP2164	UNNAMED TRIB. COTTONWOOD CREEK	1	47	PER	41.307888	96.866423	SAUNDERS	LOWER PLATTE
010094	LP2165	DUCK CREEK	1	47	PER	41.300903	96.657245	SAUNDERS	LOWER PLATTE

Table 1. continued

STORET	NDEQ_ID	STRMNAME	ORDER	ECOREG	REF/PERIENIAL	LAT_DD	LONG_DD	COUNTY	BASIN
010095	LP2166	MIDDLE CREEK	2	47	PER	40.804513	96.756987	LANCASTER	LOWER PLATTE
010096	LP2167	MILLER BRANCH	1	47	PER	41.149763	96.664378	SAUNDERS	LOWER PLATTE
010097	LP2168	NORTH BRANCH	1	47	PER	40.615986	96.767315	LANCASTER	LOWER PLATTE
010098	LP2169	HICKMAN BRANCH	1	47	PER	40.615925	96.628109	LANCASTER	LOWER PLATTE
010099	NE1176	RAKES CREEK	1	47	REF	40.871359	95.879344	CASS	NEMAHA
010100	NE1179	HONEY CREEK	1	47	PER	40.444039	95.755283	NEMAHA	NEMAHA
010101	NE1180	COTTIER CREEK	2	47	PER	40.206544	95.504768	RICHARDSON	NEMAHA
010102	NE1181	N. BRANCH WEEPING WATER CREEK	1	47	PER	40.901446	96.011950	CASS	NEMAHA
010103	NE1182	SOUTH CEDAR CREEK	1	47	REF	40.895423	96.140410	CASS	NEMAHA
010104	NE2184	PONY CREEK	2	47	REF	40.028776	95.597274	RICHARDSON	NEMAHA
010105	NE2186	UNNAMED TRIB. TURKEY CREEK	1	47	PER	40.133605	-96.168790	PAWNEE	NEMAHA
010106	NE2187	LONG BRANCH	2	47	PER	40.174917	95.962271	RICHARDSON	NEMAHA
010107	NE2188	YANKEE CREEK	2	47	PER	40.365365	96.302251	JOHNSON	NEMAHA
010108	NE2189	N. FORK BIG NEMAHA RIVER	1	47	PER	40.482406	96.423800	JOHNSON	NEMAHA
010109	NE2190	N. FORK BIG NEMAHA RIVER	3	47	PER	40.390624	96.244107	JOHNSON	NEMAHA
010110	NE2191	BALLS BRANCH	2	47	PER	40.112136	96.229778	PAWNEE	NEMAHA
010111	NE3192	LITTLE MUDDY CREEK	1	47	PER	40.562738	96.198813	OTOE	NEMAHA
010112	NE3193	INDIAN CREEK	1	47	REF	40.317006	95.769987	NEMAHA	NEMAHA
010113	NE3194	SPRING CREEK	2	47	REF	40.525198	96.081497	OTOE	NEMAHA
010114	NE3195	MUDDY CREEK	1	47	PER	40.599031	96.301660	OTOE	NEMAHA
010150	MP2057	PLATTE RIVER	5	27	PER	40.712830	99.717141	DAWSON	MIDDLE PLATTE
010151	MP2059	SPRING CREEK	1	27	PER	40.813810	99.778990	DAWSON	MIDDLE PLATTE
010152	MP2061	PAWNEE CREEK	1	27	PER	41.018260	100.379600	LINCOLN	MIDDLE PLATTE
010153	NP1099	NORTH PLATTE RIVER	5	27	PER	41.150360	100.761600	LINCOLN	NORTH PLATTE
010154	NP1101	NORTH PLATTE RIVER	5	25	PER	41.207050	101.599200	KEITH	NORTH PLATTE
010155	NP2102	NORTH PLATTE RIVER	5	25	PER	41.307000	102.110500	GARDEN	NORTH PLATTE
010156	NP2103	ASH CREEK	1	44	PER	41.366102	102.131465	GARDEN	NORTH PLATTE
010157	NP2105	BLUE CREEK	1	44	PER	41.577840	102.308000	GARDEN	NORTH PLATTE
010158	NP2106	BLUE CREEK	1	44	PER	41.495030	102.191600	GARDEN	NORTH PLATTE
010159	NP2107	NORTH PLATTE RIVER	5	25	PER	41.402870	102.431100	GARDEN	NORTH PLATTE

Table 1. continued

STORET	NDEQ_ID	STRMNAME	ORDER	ECOREG	REF/PERIENIAL	LAT_DD	LONG_DD	COUNTY	BASIN
010160	NP2108	RUSH CREEK	1	25	REF	41.321290	102.594400	GARDEN	NORTH PLATTE
010161	NP2109	UNNAMED TRIB. CEDAR CREEK	1	25	PER	41.501020	102.836300	MORRILL	NORTH PLATTE
010162	NP3110	NORTH CHANNEL NORTH PLATTE RIVER	5	25	PER	41.655430	103.062400	MORRILL	NORTH PLATTE
010163	NP3111	RED WILLOW CREEK	1	25	PER	41.735350	103.258600	MORRILL	NORTH PLATTE
010164	NP3112	NINEMILE CREEK	1	25	REF	41.886770	103.438200	SCOTTSBLUFF	NORTH PLATTE
010165	SP1031	SOUTH PLATTE RIVER	4	27	REF	41.115270	100.781300	LINCOLN	SOUTH PLATTE
010166	SP1032	FREMONT SLOUGH (MIDDLE)	1	27	PER	41.130990	100.910100	LINCOLN	SOUTH PLATTE
010167	SP1033	FREMONT SLOUGH (WEST)	1	44	PER	41.421580	100.991800	LINCOLN	SOUTH PLATTE
010168	SP1034	SOUTH PLATTE RIVER	4	25	PER	41.144390	101.202900	LINCOLN	SOUTH PLATTE
010169	SP1035	SOUTH PLATTE RIVER	4	25	PER	41.119130	101.433600	KEITH	SOUTH PLATTE
010170	SP1036	SOUTH PLATTE RIVER	4	25	PER	41.085530	101.880800	KEITH	SOUTH PLATTE
010171	SP1038	PETERSON DITCH	1	25	PER	41.001600	102.295300	DEUEL	SOUTH PLATTE
010172	SP2039	HIGHLINE CANAL	1	25	PER	41.006310	102.406700	DEUL	SOUTH PLATTE
010173	SP2040	LODGEPOLE CREEK	2	25	PER	41.080420	102.490400	DEUL	SOUTH PLATTE
010174	SP2019	LODGEPOLE CREEK	2	25	REF	41.241350	103.649200	KIMBALL	SOUTH PLATTE
010175	MP2062	PAWNEE CREEK	1	27	REF	41.020669	100.373432	LINCOLN	MIDDLE PLATTE
010176	MP1051	SILVER CREEK	1	27	PER	41.284510	97.748700	MERRICK	MIDDLE PLATTE
010177	MP2052	PLATTE RIVER	5	27	PER	40.909750	98.241690	MERRICK	MIDDLE PLATTE
010178	MP2053	PLATTE RIVER	5	27	PER	40.892880	98.265000	MERRICK	MIDDLE PLATTE
010179	MP2054	WOOD RIVER	1	27	REF	40.812520	98.648180	HALL	MIDDLE PLATTE
010180	MP2055	PLATTE RIVER	5	27	PER	40.716410	98.732140	BUFFALO	MIDDLE PLATTE
010181	EL1096	UNNAMED TRIB. PEBBLE CREEK	1	47	PER	41.755367	96.941485	CUMING	ELKHORN
010182	EL1097	DRY CREEK	1	47	PER	41.652774	97.112977	COLFAX	ELKHORN
010183	EL1098	MAPLE CREEK	3	47	PER	41.555471	96.879580	DODGE	ELKHORN
010184	EL1099	ELKHORN RIVER (E)	4	47	PER	41.621311	96.552506	DODGE	ELKHORN
010185	EL2100	LOGAN CREEK	3	47	PER	41.759257	96.508636	BURT	ELKHORN
010186	EL2102	UNNAMED TRIB. LOGAN CREEK	1	47	PER	42.103924	96.368718	THURSTON	ELKHORN
010187	EL2103	BAKER CREEK	1	47	PER	42.398857	97.037034	CEDAR	ELKHORN
010188	EL2104	DOG CREEK	1	47	PER	42.253377	96.989526	WAYNE	ELKHORN
010189	EL3105	DRY CREEK	1	47	PER	42.339394	97.778329	PIERCE	ELKHORN

Table 1. continued

STORET	NDEQ_ID	STRMNAME	ORDER	ECOREG	REF/PERIENIAL	LAT_DD	LONG_DD	COUNTY	BASIN
010190	EL3106	NORTH FORK ELKHORN RIVER	2	47	PER	42.148466	97.478468	PIERCE	ELKHORN
010191	EL4108	BATTLE CREEK	1	47	REF	41.981464	97.613909	MADISON	ELKHORN
010192	EL4111	ELKHORN RIVER (D)	3	47	REF	42.003012	97.423325	MADISON	ELKHORN
010193	EL4112	HOLT CREEK	1	44	PER	42.463674	98.842509	HOLT	ELKHORN
010194	EL4013	SOUTH FORK ELKHORN RIVER	1	44	PER	42.242337	98.399222	HOLT	ELKHORN
010195	MT1050	UNNAMED TRIB. BLACKBIRD CREEK (A)	1	47	REF	42.092173	96.403482	THURSTON	MISSOURI TRIBS
010196	MT1132	WALNUT CREEK	1	47	PER	41.156728	96.060462	SARPY	MISSOURI TRIBS
010197	MT1133	UNNAMED TRIB. BIG PAPILLION CREEK	1	47	PER	41.356648	96.144435	DOUGLAS	MISSOURI TRIBS
010198	MT1134	PIGEON CREEK (B)	1	47	PER	42.253257	96.988576	DAKOTA	MISSOURI TRIBS
010199	MT1135	WOOD CREEK	1	47	PER	42.117232	96.392053	BURT	MISSOURI TRIBS
010200	MT2141	BEAVER CREEK	1	47	REF	42.772604	97.471876	CEDAR	MISSOURI TRIBS
010201	MT1137	OMAHA CREEK	3	47	REF	42.288462	96.491296	DAKOTA	MISSOURI TRIBS
010202	MT2140	EAST BOW CREEK	2	47	PER	42.681089	97.143072	CEDAR	MISSOURI TRIBS
010203	MT1136	TEKAMAH CREEK (A)	1	47	PER	41.777108	96.207320	BURT	MISSOURI TRIBS
010204	MT2142	AOWA CREEK	3	47	PER	42.563614	96.688742	DIXON	MISSOURI TRIBS
010205	MT2143	UNNAMED TRIB. NORWEGIAN BOW CREEK	1	47	REF	42.623892	97.280976	CEDAR	MISSOURI TRIBS
010206	MT2144	BOW CREEK (B)	3	47	PER	42.628548	97.226487	CEDAR	MISSOURI TRIBS
010207	MT2145	BOW CREEK (A)	3	47	REF	42.671192	97.162743	CEDAR	MISSOURI TRIBS
010208	MT2146	JORDON CREEK	1	47	PER	42.468242	96.904615	DIXON	MISSOURI TRIBS
010209	MT2147	UNNAMED TRIB. BAZILE CREEK	1	47	PER	42.478387	97.926414	KNOX	MISSOURI TRIBS

* Per - perennial streams; Ref – reference streams

Table 2. Stream types, flow, vegetation, water temperature, flow groupings, stream conditions and definitions used during R-EMAP study.

Levels	Conditions	Explanation
Level 1 - Temperature or Ecoregion		
	Cold	Watercress or trout present
	East	Ecoregions 27,45,46,47
	Sandhills	Ecoregion 44
	West	Ecoregions 25 and 43
Level 2 - Flow Type		
	Small Stream (SMLSTRM)	Flow Class 1 (<1 cfs)
	Medium Stream (MEDSTRM)	Flow Class 2-3 (1-10 cfs)
	Large Stream (LGESTRM)	Flow Class 4-6 (10-100 cfs)
	River (River)	Flow Class 7-9 (>100 cfs)
Level 3 - Vegetation Type		
	Watercress (WC)	Watercress common to abundant. Cold water only
	Submerged (SV)	Submerged vegetation common to abundant, no watercress
	Emergent (EV)	Emergent vegetation common to abundant, no watercress or submerged vegetation
	None (NV)	No aquatic vegetation common or abundant
Level 4A - (Cold water only) - Trout Presence		
	No Trout (NT)	No trout collected in standard fish sampling
	Few Trout (FT)	1 to 9 trout collected in standard fish sampling
	Abundant Trout (AT)	10 or more trout collected in standard fish sampling
Level 4B - (Warm water only) - Substrate Type		
	Gravel	Gravel or larger is the dominant substrate
	Sand	Sand is the dominant substrate
	Silt-Clay	Silt or unconsolidated clay is the dominant substrate
	Detritus	Detritus (unconsolidated organic matter) is the dominant substrate
	Hardbed	Bedrock or hardpan clay is the dominant substrate

Table 2. continued

Flow Class	Estimated Base Flow (cfs)
1	>0.1 - <1.0
2	1 - 5
3	5 - 10
4	10 - 25
5	25 - 50
6	50 - 100
7	100 - 250
8	250 - 500
9	>500

Table 3. Macroinvertebrate taxa, taxonomy, tolerance values, and trophic levels collected in Nebraska during 1997-2001 R-EMAP

Taxacode	FinalID	Qaid	Qaid1	Class	Order	Family	Tribe	TolVal	FamTolVal	FFG	Habit
TC0330	Ablabesmyia	O[a]	O[a])	Insecta	Diptera	Chironomidae	Tanypodinae	8	8	CG[b]	BU[c]
TC0353	Acari	A	X	Arachnida	Not in I.T.I.S			6	.	PR	CB
TC0388	Acentrella	O	O	Insecta	Ephemeroptera	Baetidae		4	.	CG	CN
TC0214	Acerpenna	O	O	Insecta	Ephemeroptera	Baetidae		4	4	SH	SW
TC1517	Acilius	B	B	Insecta	Coleoptera	Dytiscidae		6	.	PR	SW
TC1746	Acroneuria	O	O	Insecta	Plecoptera	Perlidae		1	0	PR	CN
TC1745	Acroneuria abnormis	B	B	Insecta	Plecoptera	Perlidae		1	0	PR	CN
TC1391	Actinobdella	A	X	Hirudinea	Rhynchobdellida	Glossiphoniidae		2	.	PR	CN
TC1390	Actinobdella inequiannulata	O	X	Hirudinea	Rhynchobdellida	Glossiphoniidae		2	.	PR	CN
TC2213	Actionaias	O	X	Pelecypoda	Unionoida	Unionidae		1	.	CF	BU
TC2211	Actionaias ellipsiformis	O	X	Pelecypoda	Unionoida	Unionidae		1	.	CF	BU
TC2212	Actionaias ligamentina	O	X	Pelecypoda	Unionoida	Unionidae		1	.	CF	BU
TC1900	Aedes	O	O	Insecta	Diptera	Culicidae		8	.	CF	SW
TC1898	Aedes flavescens	B	B	Insecta	Diptera	Culicidae		8	.	CF	SW
TC1899	Aedes sollicitans	B	B	Insecta	Diptera	Culicidae		8	.	CF	SW
TC1901	Aedes triseriatus	B	B	Insecta	Diptera	Culicidae		8	.	CF	SW
TC1902	Aedes trivittatus	B	B	Insecta	Diptera	Culicidae		8	.	CF	SW
TC1903	Aedes vexans	B	B	Insecta	Diptera	Culicidae		8	.	CF	SW
TC1479	Aeolosoma	O	X	Oligochaeta	Polychaeta	Aeolosomatidae		9	.	CG	SW
TC1478	Aeolosoma leidyi	B	X	Oligochaeta	Polychaeta	Aeolosomatidae		9	.	CG	BU
TC1480	Aeolosoma stokesii	B	X	Oligochaeta	Polychaeta	Aeolosomatidae		9	.	CG	BU
TC1481	Aeolosomatidae	A	X	Oligochaeta	Polychaeta	Aeolosomatidae		9	.	CG	BU
TC2098	Aeschna	O	O	Insecta	Odonata	Aeshnidae		6	3	PR	CB
TC2104	Aeschnidae	A	A	Insecta	Odonata	Aeshnidae		6	3	PR	CB
TC0223	Agabus	B	B	Insecta	Coleoptera	Dytiscidae		5	.	PR	SW
TC1805	Agraylea	O	O	Insecta	Trichoptera	Hydroptilidae		4	4	PR	CB
TC0069	Agrenia	B	X	Insecta	Collembola	Isotomidae		5	.	SV	SK
TC0070	Agrenia bidenticulata	B	X	Insecta	Collembola	Isotomidae		5	.	SC	SK
TC2214	Alasmidonta marginata	O	X	Pelecypoda	Unionoida	Unionidae		0	.	PR	BU

Table 3. continued

Taxacode	FinalID	Qaid	Qaid1	Class	Order	Family	Tribe	TolVal	FamTolVal	FFG	Habit
TC1806	Alisotrichia	O	O	Insecta	Trichoptera	Hydroptilidae		4	4	PR	CN
TC1734	Alloperla	O	O	Insecta	Plecoptera	Chloroperlidae		1	.	PR	CN
TC1579	Alluaudomyia	B	B	Insecta	Diptera	Ceratopogonidae		6	6	PR	SP
TC2215	Amblema plicata	O	X	Pelecypoda	Unionoida	Unionidae		5	.	CF	BU
TC2049	Ambrysus	B	X	Insecta	Hemiptera	Naucoridae		4	.	PR	SW
TC2020	Ameletus	O	O	Insecta	Ephemeroptera	Siphlonuridae		0	0	CG	CN
TC3266	Amercaenis	O	O	Insecta	Ephemeroptera	Caenidae		7	.	CG	SP
TC1769	Amiocentrus	O	O	Insecta	Trichoptera	Brachycentridae		4	1	CG	CN
TC2184	Amnicola	O	X	Gastropoda	Prosobranchia	Bulimidae		6	.	SC	SP
TC2183	Amnicola integra	B	X	Gastropoda	Prosobranchia	Bulimidae		6	.	SC	SP
TC2110	Amphiagrion	O	O	Insecta	Odonata	Coenagrionidae		8	9	PR	CB
TC1398	Amphichaeta	O	O	Oligochaeta	Haplotaxida	Naididae		8	.	CG	CN
TC1399	Amphichaeta leydigi	B	B	Oligochaeta	Haplotaxida	Naididae		8	.	CG	CN
TC1738	Amphinemura	O	O	Insecta	Plecoptera	Nemouridae		1	3	SC	SP
TC1492	Amphipoda	A	A	Crustacea	Amphipoda				.	CG	SW
TC1545	Anacaena	B	B	Insecta	Coleoptera	Hydrophilidae		8	.	PR	SW
TC2100	Anax	O	O	Insecta	Odonata	Aeshnidae		8	3	PR	CB
TC2099	Anax junius	B	B	Insecta	Odonata	Aeshnidae		8	3	PR	CB
TC2195	Ancylidae	A	X	Gastropoda	Pulmonata	Ancylidae		8	6	SC	CN
TC0231	Ancyronyx	B	B	Insecta	Coleoptera	Elmidae		2	6	CG	CN
TC0232	Ancyronyx variegatus	B	B	Insecta	Coleoptera	Elmidae		4	6	CG	CN
TC1984	Anepeorus	O	O	Insecta	Ephemeroptera	Heptageniidae		4	.	CG	CN
TC1482	Annelida	A	A						.	CG	BU
TC2218	Anodonta	O	X	Pelecypoda	Unionoida	Unionidae		8	.	CF	BU
TC2216	Anodonta grandis	O	X	Pelecypoda	Unionoida	Unionidae		7	.	CF	BU
TC2217	Anodonta imbecilis	O	X	Pelecypoda	Unionoida	Unionidae		6	.	CF	BU
TC2219	Anodonta suborbiculata	O	X	Pelecypoda	Unionoida	Unionidae		0	.	CF	BU
TC2220	Anodontoides ferussacianus	O	X	Pelecypoda	Unionoida	Unionidae		2	.	CF	BU
TC1909	Anopheles	O	O	Insecta	Diptera	Culicidae		9	.	CF	SW

Table 3. continued

Taxacode	FinalID	Qaid	Qaid1	Class	Order	Family	Tribe	TolVal	FamTolVal	FFG	Habit
TC1904	Anopheles barberi	B	B	Insecta	Diptera	Culicidae		9	.	CF	SW
TC1905	Anopheles crucians	B	B	Insecta	Diptera	Culicidae		9	.	CF	SW
TC1906	Anopheles pseudopunctipennis	B	B	Insecta	Diptera	Culicidae		9	.	CF	SW
TC1907	Anopheles punctipennis	B	B	Insecta	Diptera	Culicidae		9	.	CF	SW
TC1908	Anopheles quadrimaculatus	B	B	Insecta	Diptera	Culicidae		9	.	CF	SW
TC1910	Anopheles walkeri	B	B	Insecta	Diptera	Culicidae		9	.	CF	SW
TC1577	Anthomyiidae	O	O	Insecta	Diptera	Anthomyiidae		6	.	PR	SP
TC0051	Antocha	B	B	Insecta	Diptera	Tipulidae		3	3	CG	SP
TC3238	Apedilum	O	O	Insecta	Diptera	Chironomidae	Chironomini	5	8	CG	BU
TC1595	Apsectrotanypus	O	O	Insecta	Diptera	Chironomidae	Tanypodinae	2	2	PR	SW
TC1483	Arachnida	O	X	Arachnida				6	.	CG	CB
TC1711	Archilestes	O	O	Insecta	Odonata	Lestidae		6	9	PR	CB
TC1710	Archilestes grandis	B	B	Insecta	Odonata	Lestidae		6	9	PR	CB
TC2113	Argia	O	O	Insecta	Odonata	Coenagrionidae		8	9	PR	CB
TC2111	Argia bipunctulata	B	B	Insecta	Odonata	Coenagrionidae		8	9	PR	CB
TC2112	Argia fumipennis violacea	B	B	Insecta	Odonata	Coenagrionidae		8	9	PR	CB
TC1698	Arigomphus	O	O	Insecta	Odonata	Gomphidae		6	1	PR	BU
TC0098	Arthroplea	O	O	Insecta	Ephemeroptera	Heptageniidae		5	.	CG	SW
TC1506	Asellidae	A	A	Crustacea	Isopoda	Asellidae		6	8	SC	SP
TC1502	Asellus	O	O	Crustacea	Isopoda	Asellidae		6	8	SC	SP
TC1501	Asellus intermedius	B	B	Crustacea	Isopoda	Asellidae		6	8	SC	SP
TC1493	Astacidae	O	O	Crustacea	Decapoda	Astacidae		8	.	SC	SP
TC1833	Asynarchus	O	O	Insecta	Trichoptera	Limnephilidae		1	4	SH	CN
TC0337	Athericidae	O	O	Insecta	Diptera	Athericidae		10	2	PR	BU
TC0054	Atherix	B	B	Insecta	Diptera	Athericidae		4	2	PR	BU
TC1578	Atherix lantha	B	B	Insecta	Diptera	Athericidae		4	2	PR	BU
TC0335	Atherix variegata	B	B	Insecta	Diptera	Athericidae		2	2	PR	BU
TC0389	Atrichopogon	B	B	Insecta	Diptera	Ceratopogonidae		6	.	PR	BU
TC1580	Atrichopogon peregrimus	B	B	Insecta	Diptera	Ceratopogonidae		6	.	PR	SP

Table 3. continued

Taxacode	FinalID	Qaid	Qaid1	Class	Order	Family	Tribe	TolVal	FamTolVal	FFG	Habit
TC1581	Atrichopogon websteri	B	B	Insecta	Diptera	Ceratopogonidae		6	.	PR	SP
TC1454	Aulodrilus	O	O	Oligochaeta	Haplotaxida	Tubificidae		8	.	CG	BU
TC1452	Aulodrilus pigueti	B	B	Oligochaeta	Haplotaxida	Tubificidae		8	.	CG	BU
TC1453	Aulodrilus pluriseta	B	B	Oligochaeta	Haplotaxida	Tubificidae		8	.	CG	BU
TC1451	Aulodrlus limnobius	B	B	Oligochaeta	Haplotaxida	Tubificidae		8	.	CG	BU
TC1597	Axarus	O	O	Insecta	Diptera	Chironomidae	Chironomini	3	8	CG	SP
TC1596	Axarus scopula	B	B	Insecta	Diptera	Chironomidae	Chironomini	3	8	CG	SP
TC0055	Baetidae	A	A	Insecta	Ephemeroptera	Baetidae		4	4	CG	SP
TC0056	Baetis	O	O	Insecta	Ephemeroptera	Baetidae		5	4	CG	SP
TC3246	Baetis intercalaris	B	B	Insecta	Ephemeroptera	Baetidae		5	6	CG	SP
TC1975	Baetisca	O	O	Insecta	Ephemeroptera	Baetiscidae		2	5	CG	SW
TC1976	Baetiscidae	A	A	Insecta	Ephemeroptera	Baetiscidae		4	3	CG	SW
TC1598	Beckidia	O	O	Insecta	Diptera	Chironomidae	Orthocladiinae	4	.	CG	SP
TC1599	Beckidia tethys	B	B	Insecta	Diptera	Chironomidae	Orthocladiinae	4	.	CG	SP
TC2024	Belostoma	O	X	Insecta	Hemiptera	Belostomatidae		8	.	PR	SW
TC2028	Belostomatidae	A	X	Insecta	Hemiptera	Belostomatidae		8	.	PR	SW
TC3231	Berosus	B	B	Insecta	Coleoptera	Hydrophilidae		8	.	PR	SW
TC1546	Berosus styliferus	B	B	Insecta	Coleoptera	Hydrophilidae		6	.	PR	SW
TC1582	Bezzia	B	B	Insecta	Diptera	Ceratopogonidae		6	6	PR	SP
TC1518	Bidessus	B	B	Insecta	Coleoptera	Dytiscidae		8	.	PR	SW
TC0331	Boreochlus	O	O	Insecta	Diptera	Chironomidae	Podonominae	6	.	CG	SP
TC2101	Boyeria	O	O	Insecta	Odonata	Aeshnidae		6	2	PR	CB
TC2102	Boyeria vinosa	B	B	Insecta	Odonata	Aeshnidae		6	2	PR	CB
TC1772	Brachycentridae	A	A	Insecta	Trichoptera	Brachycentridae		1	1	CF	CB
TC1771	Brachycentrus	O	O	Insecta	Trichoptera	Brachycentridae		1	1	CF	CB
TC1770	Brachycentrus numerosus	B	B	Insecta	Trichoptera	Brachycentridae		1	1	CF	CB
TC0412	Brachycercus	O	O	Insecta	Ephemeroptera	Caenidae		3	3	CG	SP
TC1395	Branchiobdellida	A	X	Oligochaeta	Branchiobdellida			6	.	CG	CN
TC1394	Branchiobdellidae	O	X	Oligochaeta	Branchiobdellida	Branchiobdellidae		6	.	CG	CN

Table 3. continued

Taxacode	FinalID	Qaid	Qaid1	Class	Order	Family	Tribe	TolVal	FamTolVal	FFG	Habit
TC1456	Branchiura	O	O	Oligochaeta	Haplotaxida	Tubificidae		10	.	CG	CN
TC1455	Branchiura sowerbyi	B	B	Oligochaeta	Haplotaxida	Tubificidae		10	.	CG	CN
TC1400	Bratislavia	O	O	Oligochaeta	Haplotaxida	Naididae		6	.	CG	CN
TC1401	Bratislavia bilongata	B	B	Oligochaeta	Haplotaxida	Naididae		6	.	CG	CN
TC1600	Brillia	O	O	Insecta	Diptera	Chironomidae	Orthocladiinae	4	5	SH	SP
TC0058	Brychius	B	B	Insecta	Coleoptera	Haliplidae		5	.	SC	CN
TC2160	Bryozoa	O	X	Ectoprocta	Phylactolaemata			6	.	CF	CN
TC2185	Bulimidae	A	X	Gastropoda	Prosobranchia	Bulimidae		6	.	SC	SP
TC1503	Caecidotea	O	O	Crustacea	Isopoda	Asellidae		8	8	SC	CN
TC1504	Caecidotea intermedia	B	B	Crustacea	Isopoda	Asellidae		6	8	SC	CN
TC0213	Caenidae	A	A	Insecta	Ephemeroptera	Caenidae		6	7	CG	SP
TC0060	Caenis	O	O	Insecta	Ephemeroptera	Caenidae		7	7	CG	SP
TC1966	Callibaetis	O	O	Insecta	Ephemeroptera	Baetidae		7	4	CG	SW
TC3245	Callicorixa	B	X	Insecta	Hemiptera	Corixidae		10	.	PR	SW
TC1946	Caloparyphus	B	B	Insecta	Diptera	Stratiomyidae		8	.	PR	SP
TC2109	Calopterygidae	A	A	Insecta	Odonata	Calopterygidae			5		
TC2106	Calopteryx	O	O	Insecta	Odonata	Calopterygidae		4	5	PR	CB
TC2105	Calopteryx maculata	B	B	Insecta	Odonata	Calopterygidae		4	5	PR	CB
TC1499	Cambaridae	O	O	Crustacea	Decapoda	Cambaridae		6	.	SC	SP
TC1393	Cambarincola	B	X	Oligochaeta	Branchiobdellida	Branchiobdellidae		6	.	CG	CN
TC1494	Cambarus	B	B	Crustacea	Decapoda	Cambaridae		6	.	SC	SP
TC3268	Camelobaetidius	O	O	Insecta	Ephemeroptera	Baetidae		2	.	SH	SW
TC2189	Campeloma	O	X	Gastropoda	Prosobranchia	Viviparidae		0	.	SC	SP
TC1510	Carabidae	O	O	Insecta	Coleoptera	Carabidae		6	.	SC	CN
TC1602	Cardiocladius	O	O	Insecta	Diptera	Chironomidae	Orthocladiinae	2	6	CG	CN
TC1601	Cardiocladius obscurus	B	B	Insecta	Diptera	Chironomidae	Orthocladiinae	5	5	CG	CN
TC2179	Cassidae	O	X	Gastropoda	Mesogastropoda	Cassidae		4	.	SC	SP
TC2178	Cassis	O	X	Gastropoda	Mesogastropoda	Cassidae		4	.	SC	SP
TC1714	Celithemis	O	O	Insecta	Odonata	Libellulidae		8	9	PR	CB

Table 3. continued

Taxacode	FinalID	Qaid	Qaid1	Class	Order	Family	Tribe	TolVal	FamTolVal	FFG	Habit
TC1713	Celithemis elisa	B	B	Insecta	Odonata	Libellulidae		8	9	PR	CB
TC1967	Centroptilum	O	O	Insecta	Ephemeroptera	Baetidae		1	2	CG	SW
TC1820	Ceraclea	O	O	Insecta	Trichoptera	Leptoceridae		4	3	CG	CB
TC1583	Ceratopogon	B	B	Insecta	Diptera	Ceratopogonidae		6	6	PR	SP
TC1590	Ceratopogonidae	O	O	Insecta	Diptera	Ceratopogonidae		6	6	PR	SP
TC1780	Ceratopsyche	O	O	Insecta	Trichoptera	Hydropsychidae		4	4	CF	CN
TC1781	Ceratopsyche alhedra	O	O	Insecta	Trichoptera	Hydropsychidae		4	3	CF	CN
TC1782	Ceratopsyche bronta	O	O	Insecta	Trichoptera	Hydropsychidae		4	5	CF	CN
TC1783	Ceratopsyche morosa	O	O	Insecta	Trichoptera	Hydropsychidae		4	2	CF	CN
TC1784	Ceratopsyche morosa bifida	O	O	Insecta	Trichoptera	Hydropsychidae		4	2	CF	CN
TC1785	Ceratopsyche slossonae	O	O	Insecta	Trichoptera	Hydropsychidae		2	4	CF	CN
TC1786	Ceratopsyche sparna	O	O	Insecta	Trichoptera	Hydropsychidae		2	1	CF	CN
TC3243	Cercobrachys	O	O	Insecta	Ephemeroptera	Caenidae		5	.	CG	SP
TC1548	Cercyon	B	B	Insecta	Coleoptera	Hydrophilidae		5	.	PR	CB
TC1547	Cercyon praetexatus	B	B	Insecta	Coleoptera	Hydrophilidae		5	.	PR	CB
TC1550	Chaetarthria	B	B	Insecta	Coleoptera	Hydrophilidae		6	.	CG	CB
TC1549	Chaetarthria pallida	B	B	Insecta	Coleoptera	Hydrophilidae		6	.	CG	CB
TC1603	Chaetocladius	O	O	Insecta	Diptera	Chironomidae	Orthocladiinae	6	6	CG	SP
TC0339	Chaetogaster	O	O	Oligochaeta	Haplotaxida	Naididae		10	.	CG	CN
TC1402	Chaetogaster diaphanus	B	B	Oligochaeta	Haplotaxida	Naididae		6	.	CG	CN
TC1403	Chaetogaster diastrophus	B	B	Oligochaeta	Haplotaxida	Naididae		6	.	CG	CN
TC1404	Chaetogaster setosus	B	B	Oligochaeta	Haplotaxida	Naididae		6	.	CG	CN
TC1594	Chaoboridae	O	O	Insecta	Diptera	Chaoboridae		8	.	PR	CN
TC1576	Chaoborus	B	B	Insecta	Diptera	Chaoboridae		8	8	PR	SP
TC1591	Chaoborus americanus	B	B	Insecta	Diptera	Chaoboridae		8	8	PR	SP
TC1592	Chaoborus flavicans	B	B	Insecta	Diptera	Chaoboridae		8	8	PR	SP
TC1593	Chaoborus punctipennis	B	B	Insecta	Diptera	Chaoboridae		8	8	PR	SP
TC2087	Chauliodes	O	X	Insecta	Megaloptera	Corydalidae		4	0	PR	CB
TC2085	Chauliodes pectinicornis	B	X	Insecta	Megaloptera	Corydalidae		4	0	PR	CB

Table 3. continued

Taxacode	FinalID	Qaid	Qaid1	Class	Order	Family	Tribe	TolVal	FamTolVal	FFG	Habit
TC2086	Chauliodes rastricornis	B	X	Insecta	Megaloptera	Corydalidae		4	0	PR	CB
TC3247	Chelifera	B	B	Insecta	Diptera	Empididae		9	.	CG	SP
TC1606	Chernovskiia	O	O	Insecta	Diptera	Chironomidae	Chironomini	4	8	CG	BU
TC1604	Chernovskiia amphitrite	B	B	Insecta	Diptera	Chironomidae	Orthocladiinae	4	8	CG	BU
TC1605	Chernovskiia orbicus	B	B	Insecta	Diptera	Chironomidae	Chironomini	4	8	CG	BU
TC0390	Cheumatopsyche	O	O	Insecta	Trichoptera	Hydropsychidae		5	5	CF	CN
TC2139	Chimarra	O	O	Insecta	Trichoptera	Philopotamidae		1	4	CF	CN
TC2136	Chimarra aterrima	B	B	Insecta	Trichoptera	Philopotamidae		1	4	CF	CN
TC2137	Chimarra feria	B	B	Insecta	Trichoptera	Philopotamidae		1	4	CF	CN
TC2138	Chimarra obscura	B	B	Insecta	Trichoptera	Philopotamidae		1	4	CF	CN
TC0063	Chironomidae	A	A	Insecta	Diptera	Chironomidae		6	.	CG	SP
TC1607	Chironomini	A	A	Insecta	Diptera	Chironomidae	Chironomini	8	8	CG	SP
TC0064	Chironomus	O	O	Insecta	Diptera	Chironomidae	Chironomini	10	10	CG	BU
TC1608	Chironomus plumosus	B	B	Insecta	Diptera	Chironomidae	Chironomini	10	8	CG	BU
TC1609	Chironomus riparius	B	B	Insecta	Diptera	Chironomidae	Chironomini	10	8	CG	BU
TC1735	Chloroperlidae	A	A	Insecta	Plecoptera	Chloroperlidae		1	.	PR	CN
TC2005	Choroterpes	O	O	Insecta	Ephemeroptera	Leptophlebiidae		1	2	CG	CN
TC2114	Chromagrion conditum	O	O	Insecta	Odonata	Coenagrionidae		4	4	PR	CB
TC0229	Chrysomelidae	O	O	Insecta	Coleoptera	Chrysomelidae		6	.	SH	CN
TC1955	Chrysops	B	B	Insecta	Diptera	Tabanidae		6	6	SH	BU
TC1610	Cladopelma	O	O	Insecta	Diptera	Chironomidae	Chironomini	8	9	CG	CN
TC0391	Cladotanytarsus	O	O	Insecta	Diptera	Chironomidae	Tanytarsini	7	7	CG	CB
TC2165	Clavidae	B	X	Hydrozoa	Hydroida	Clavidae			.	CG	CN
TC2094	Climacia	B	X	Insecta	Neuroptera	Sisyridae		6	4	PR	CB
TC2093	Climacia areolaris	B	X	Insecta	Neuroptera	Sisyridae		6	4	PR	CB
TC0067	Clinocera	B	B	Insecta	Diptera	Empididae		6	.	PR	SP
TC0424	Clinotanypus	O	O	Insecta	Diptera	Chironomidae	Tanypodinae	8	8	PR	SP
TC1611	Clinotanypus pinguis	B	B	Insecta	Diptera	Chironomidae	Tanypodinae	8	8	PR	SP
TC1754	Clioperla	O	O	Insecta	Plecoptera	Perlodidae		4	2	PR	BU

Table 3. continued

Taxacode	FinalID	Qaid	Qaid1	Class	Order	Family	Tribe	TolVal	FamTolVal	FFG	Habit
TC1968	Cloeon	O	O	Insecta	Ephemeroptera	Baetidae		3	4	CG	CN
TC1940	Cnephia	B	B	Insecta	Diptera	Simuliidae		6	6	CF	SW
TC1613	Coelotanypus	O	O	Insecta	Diptera	Chironomidae	Tanypodinae	6	6	PR	SP
TC1612	Coelotanypus scapularis	B	B	Insecta	Diptera	Chironomidae	Tanypodinae	6	6	PR	SP
TC2115	Coenagrion	O	O	Insecta	Odonata	Coenagrionidae		6	9	PR	CB
TC2121	Coenagrionidae	A	A	Insecta	Odonata	Coenagrionidae		6	9	PR	CB
TC0222	Coleoptera	A	A	Insecta	Coleoptera	Coleoptera		4	.	PR	SW
TC0211	Collembola	O	X	Insecta	Collembola	Collembola		10	.	CG	UN
TC1519	Colymbetes	B	B	Insecta	Coleoptera	Dytiscidae		4	.	PR	SW
TC1614	Conchapelopia	O	O	Insecta	Diptera	Chironomidae	Tanypodinae	6	6	PR	SP
TC1615	Constempellina	O	O	Insecta	Diptera	Chironomidae	Tanytarsini	6	6	CG	SP
TC3267	Copelatus	B	B	Insecta	Coleoptera	Dytiscidae		8	.	PR	SW
TC1520	Coptotomus	B	B	Insecta	Coleoptera	Dytiscidae		8	.	PR	SW
TC2258	Corbicula	O	X	Pelecypoda	Unionoida	Corbiculidae		6	.	CF	BU
TC2259	Corbicula fluminea	B	X	Pelecypoda	Unionoida	Corbiculidae		6	.	CF	BU
TC2122	Cordulegaster	O	O	Insecta	Odonata	Cordulegastridae		3	3	PR	SP
TC1689	Cordulegaster obliqua	B	B	Insecta	Odonata	Cordulegastridae		3	3	PR	SP
TC1692	Cordulegastridae	A	A	Insecta	Odonata	Cordulegastridae		4	3	PR	CB
TC1693	Cordulia	O	O	Insecta	Odonata	Corduliidae		4	5	PR	CB
TC1697	Corduliidae	A	A	Insecta	Odonata	Corduliidae		4	5	PR	CB
TC2162	Cordylophora	A	X	Hydrozoa	Hydroida	Clavidae		5	.	CF	CN
TC2163	Cordylophora lacustris	O	X	Hydrozoa	Hydroida	Clavidae		5	.	CF	CN
TC3257	Corisella	B	X	Insecta	Hemiptera	Corixidae		9	.	PR	SW
TC2031	Corixidae	O	X	Insecta	Hemiptera	Corixidae		10	.	PR	SW
TC2090	Corydalidae	A	X	Insecta	Megaloptera	Corydalidae		4	0	PR	CB
TC2089	Corydalus	O	X	Insecta	Megaloptera	Corydalidae		4	6	PR	CB
TC2088	Corydalus cornutus	B	X	Insecta	Megaloptera	Corydalidae		4	6	PR	CB
TC1616	Corynoneura	O	O	Insecta	Diptera	Chironomidae	Orthocladiinae	3	7	CG	SP
TC1487	Crangonycitidae	A	A	Crustacea	Amphipoda	Crangonyctidae		2	4	CG	SW

Table 3. continued

Taxacode	FinalID	Qaid	Qaid1	Class	Order	Family	Tribe	TolVal	FamTolVal	FFG	Habit
TC1486	Crangonyx	O	O	Crustacea	Amphipoda	Crangonyctidae		2	4	CG	SW
TC1484	Crangonyx forbesi	B	B	Crustacea	Amphipoda	Crangonyctidae		2	4	CG	SW
TC1485	Crangonyx gracilis	B	B	Crustacea	Amphipoda	Crangonyctidae		2	4	CG	SW
TC1623	Cricotopus	O	O	Insecta	Diptera	Chironomidae	Orthocladiinae	7	7	SH	SP
TC1618	Cricotopus bicinctus	O	O	Insecta	Diptera	Chironomidae	Orthocladiinae	7	7	CG	SP
TC1619	Cricotopus cylindraceus	O	O	Insecta	Diptera	Chironomidae	Orthocladiinae	7	7	CG	SP
TC1620	Cricotopus fuscus	O	O	Insecta	Diptera	Chironomidae	Orthocladiinae	8	7	CG	SP
TC1621	Cricotopus intersectus	O	O	Insecta	Diptera	Chironomidae	Orthocladiinae	8	7	CG	SP
TC1617	Cricotopus Isocladius	O	O	Insecta	Diptera	Chironomidae	Orthocladiinae	7	7	SC	SP
TC1622	Cricotopus laricomalis	O	O	Insecta	Diptera	Chironomidae	Orthocladiinae	9	7	CG	SP
TC1624	Cricotopus sylvestris	O	O	Insecta	Diptera	Chironomidae	Orthocladiinae	8	7	CG	SP
TC1625	Cricotopus tibialis	O	O	Insecta	Diptera	Chironomidae	Orthocladiinae	5	7	CG	SP
TC1626	Cricotopus tremulus	O	O	Insecta	Diptera	Chironomidae	Orthocladiinae	5	7	SH	SP
TC1627	Cricotopus triangulatus	O	O	Insecta	Diptera	Chironomidae	Orthocladiinae	6	7	CG	SP
TC1628	Cricotopus tricinctus	O	O	Insecta	Diptera	Chironomidae	Orthocladiinae	4	7	CG	SP
TC1629	Cricotopus trifascia	O	O	Insecta	Diptera	Chironomidae	Orthocladiinae	4	7	CG	SP
TC1630	Cricotopus trifasciatus	O	O	Insecta	Diptera	Chironomidae	Orthocladiinae	6	7	CG	SP
TC1631	Cricotopus vierriensis	O	O	Insecta	Diptera	Chironomidae	Orthocladiinae	4	7	CG	SP
TC2050	Cryphocricos	B	X	Insecta	Hemiptera	Naucoridae		6	.	CG	SW
TC1633	Cryptochironomus	O	O	Insecta	Diptera	Chironomidae	Chironomini	8	8	PR	SP
TC1632	Cryptochironomus digitatus	B	B	Insecta	Diptera	Chironomidae	Chironomini	8	8	PR	SP
TC3232	Cryptochironomus fulvus	B	B	Insecta	Diptera	Chironomidae	Chironomini	8	8	PR	SP
TC1551	Cryptopleurum	B	B	Insecta	Coleoptera	Hydrophilidae		6	.	PR	BU
TC1634	Cryptotendipes	O	O	Insecta	Diptera	Chironomidae	Chironomini	6	6	CG	SP
TC1915	Culex	O	O	Insecta	Diptera	Culicidae		9	.	CF	SW
TC1911	Culex pipiens	B	B	Insecta	Diptera	Culicidae		9	.	CF	SW
TC1912	Culex quinquefasciatus	B	B	Insecta	Diptera	Culicidae		9	.	CF	SW
TC1913	Culex restuans	B	B	Insecta	Diptera	Culicidae		9	.	CF	SW
TC1914	Culex salinarius	B	B	Insecta	Diptera	Culicidae		9	.	CF	SW

Table 3. continued

Taxacode	FinalID	Qaid	Qaid1	Class	Order	Family	Tribe	TolVal	FamTolVal	FFG	Habit
TC1916	Culex tarsalis	B	B	Insecta	Diptera	Culicidae		9	.	CF	SW
TC0332	Culicidae	A	A	Insecta	Diptera	Culicidae		8	.	PR	SW
TC1584	Culicoides	B	B	Insecta	Diptera	Ceratopogonidae		8	10	CG	SP
TC2287	Cura foremanii	O	O	Turbellaria	Tricladida	Planariidae		1	.	CG	SP
TC1513	Curculionidae	O	O	Insecta	Coleoptera	Curculionidae		6	.	SH	CB
TC0224	Cybister	B	B	Insecta	Coleoptera	Dytiscidae		5	.	PR	SW
TC0233	Cylloepus	B	B	Insecta	Coleoptera	Elmidae		5	.	CG	CN
TC1552	Cymbiodyta	B	B	Insecta	Coleoptera	Hydrophilidae		6	.	CG	BU
TC1553	Cymbiodyta toddi	B	B	Insecta	Coleoptera	Hydrophilidae		6	.	CG	BU
TC1635	Cyphomella	O	O	Insecta	Diptera	Chironomidae	Chironomini	4	8	CG	SP
TC1567	Cyphon	B	B	Insecta	Coleoptera	Scirtidae		6	.	SC	CB
TC2144	Cyrnellus	O	O	Insecta	Trichoptera	Polycentropodidae		4	8	CF	CN
TC2143	Cyrnellus fraternus	B	B	Insecta	Trichoptera	Polycentropodidae		4	8	CF	CN
TC1969	Dactylobaetis	O	O	Insecta	Ephemeroptera	Baetidae		2	4	SH	SW
TC1957	Dactylolabis montana	B	B	Insecta	Diptera	Tipulidae		6	4	SH	SW
TC0341	Dannella	O	O	Insecta	Ephemeroptera	Ephemerellidae		2	1	SC	CN
TC1585	Dasyhelea	B	B	Insecta	Diptera	Ceratopogonidae		6	6	CG	SP
TC1500	Decapoda	A	A	Crustacea	Decapoda				.	SC	SP
TC1636	Demicryptochironomus	O	O	Insecta	Diptera	Chironomidae	Chironomini	3	8	CG	BU
TC0413	Dero	O	O	Oligochaeta	Haplotaxida	Naididae		9	.	CG	CN
TC1405	Dero digitata	B	B	Oligochaeta	Haplotaxida	Naididae		9	.	CG	CN
TC1406	Dero dorsalis	B	B	Oligochaeta	Haplotaxida	Naididae		8	.	CG	CN
TC1407	Dero furcata	B	B	Oligochaeta	Haplotaxida	Naididae		9	.	CG	CN
TC1408	Dero lodeni	B	B	Oligochaeta	Haplotaxida	Naididae		6	.	CG	CN
TC1409	Dero nivea	B	B	Oligochaeta	Haplotaxida	Naididae		9	.	CG	CN
TC1410	Dero obtusa	B	B	Oligochaeta	Haplotaxida	Naididae		8	.	CG	CN
TC1411	Dero vaga	B	B	Oligochaeta	Haplotaxida	Naididae		6	.	CG	CN
TC1521	Deronectes	B	B	Insecta	Coleoptera	Dytiscidae		6	.	PR	SW
TC1637	Diamesa	O	O	Insecta	Diptera	Chironomidae	Diamesinae	2	6	CG	SP

Table 3. continued

Taxacode	FinalID	Qaid	Qaid1	Class	Order	Family	Tribe	TolVal	FamTolVal	FFG	Habit
TC1554	Dibolocelus	B	B	Insecta	Coleoptera	Hydrophilidae		8	.	CG	SW
TC1834	Dicosmoecus	O	O	Insecta	Trichoptera	Limnephilidae		2	4	SH	CN
TC0071	Dicranota	B	B	Insecta	Diptera	Tipulidae		3	3	PR	SP
TC0392	Dicrotendipes	O	O	Insecta	Diptera	Chironomidae	Chironomini	6	8	CG	CN
TC1638	Dicrotendipes modestus	B	B	Insecta	Diptera	Chironomidae	Chironomini	6	5	CG	CB
TC3236	Dicrotendipes neomodestus	B	B	Insecta	Diptera	Chironomidae	Chironomini	6	8	CG	CB
TC1639	Dicrotendipes nervosus	B	B	Insecta	Diptera	Chironomidae	Chironomini	6	8	CG	CB
TC1938	Dictya	B	B	Insecta	Diptera	Sciomyzidae		6	.	PR	SP
TC1726	Didymops	O	O	Insecta	Odonata	Macromiidae		6	3	PR	SP
TC1727	Didymops transversa	B	B	Insecta	Odonata	Macromiidae		6	3	PR	SP
TC1378	Dina	O	X	Hirudinea	Pharyngobdellida	Erpobdellidae		8	.	PR	CN
TC1379	Dina parva	B	X	Hirudinea	Pharyngobdellida	Erpobdellidae		8	.	PR	CN
TC0226	Dineutus	B	B	Insecta	Coleoptera	Gyrinidae		4	.	PR	SK
TC1787	Diplectrona	O	O	Insecta	Trichoptera	Hydropsychidae		0	3	CF	CN
TC1641	Diplocladius	O	O	Insecta	Diptera	Chironomidae	Orthocladiinae	8	8	CG	SP
TC1640	Diplocladius cultriger	B	B	Insecta	Diptera	Chironomidae	Orthocladiinae	8	8	CG	SP
TC0329	Diptera	A	A	Insecta	Diptera	Diptera		10	.		
TC3269	Disonycha	B	B	Insecta	Coleoptera	Chrysomelidae		8	.	SH	CN
TC1919	Dixa	B	B	Insecta	Diptera	Dixidae		6	.	CG	SP
TC1920	Dixella	B	B	Insecta	Diptera	Dixidae		6	.	CG	SP
TC1921	Dixidae	O	O	Insecta	Diptera	Dixidae		6	.	CG	SP
TC1922	Dolichopodidae	O	O	Insecta	Diptera	Dolichopodidae		5	4	PR	SP
TC0230	Donacia	B	B	Insecta	Coleoptera	Chrysomelidae		8	.	SH	CN
TC1699	Dromogomphus	O	O	Insecta	Odonata	Gomphidae		6	1	PR	BU
TC1516	Dryopidae	O	O	Insecta	Coleoptera	Dryopidae		6	5	SH	CB
TC0072	Dubiraphia	B	B	Insecta	Coleoptera	Elmidae		6	6	CG	CN
TC2289	Dugesia	A	A	Turbellaria	Tricladida	Planariidae		8	.	CG	SP
TC2288	Dugesia dorotocephala	O	O	Turbellaria	Tricladida	Planariidae		3	.	CG	SP
TC2290	Dugesia tigrina	O	O	Turbellaria	Tricladida	Planariidae		8	.	CG	SP

Table 3. continued

Taxacode	FinalID	Qaid	Qaid1	Class	Order	Family	Tribe	TolVal	FamTolVal	FFG	Habit
TC1534	Dytiscidae	O	O	Insecta	Coleoptera	Dytiscidae		5	.	PR	SW
TC1522	Dytiscus	B	B	Insecta	Coleoptera	Dytiscidae		4	.	PR	SW
TC1747	Eccoptura	O	O	Insecta	Plecoptera	Perlidae		1	1	PR	CN
TC1571	Ectopria	O	O	Insecta	Coleoptera	Psephenidae		4	5	SC	CN
TC1642	Einfeldia	O	O	Insecta	Diptera	Chironomidae	Chironomini	8	8	CG	SP
TC2221	Ellipsaria lineolata	O	X	Pelecypoda	Unionoida	Unionidae		0	.	CF	BU
TC2222	Elliptio dilatatus	O	X	Pelecypoda	Unionoida	Unionidae		4	.	CF	BU
TC1539	Elmidae	O	O	Insecta	Coleoptera	Elmidae		5	4	CG	CB
TC1568	Elodes	B	B	Insecta	Coleoptera	Scirtidae		6	.	SC	CB
TC1923	Empididae	O	O	Insecta	Diptera	Empididae		8	6	CG	SP
TC2117	Enallagma	O	O	Insecta	Odonata	Coenagrionidae		9	9	PR	CB
TC2116	Enallagma praevarum	B	B	Insecta	Odonata	Coenagrionidae		9	9	PR	CB
TC0425	Enchytraeidae	O	O	Oligochaeta	Haplotaxida	Enchytraeidae		9	.	CG	BU
TC0426	Endochironomus	O	O	Insecta	Diptera	Chironomidae	Chironomini	9	8	SH	SP
TC1643	Endochironomus nigricans	B	B	Insecta	Diptera	Chironomidae	Chironomini	9	8	SH	SP
TC1555	Enochrus	B	B	Insecta	Coleoptera	Hydrophilidae		5	.	CG	BU
TC2285	Enopla	O	O	Enopla				6	.	CG	SP
TC0074	Epeorus	O	O	Insecta	Ephemeroptera	Heptageniidae		0	0	SC	CN
TC1978	Ephemera	O	O	Insecta	Ephemeroptera	Ephemeridae		4	1	CG	BU
TC0075	Ephemerella	O	O	Insecta	Ephemeroptera	Ephemerellidae		1	1	CG	CN
TC0217	Ephemerellidae	A	A	Insecta	Ephemeroptera	Ephemerellidae		4	1	CG	CN
TC1983	Ephemeridae	A	A	Insecta	Ephemeroptera	Ephemeridae		4	1	CG	CN
TC0076	Ephemeroptera	A	A	Insecta	Ephemeroptera	Ephemeroptera		3	.	CG	CN
TC2016	Ephoron	O	O	Insecta	Ephemeroptera	Polymitarcyidae		2	2	CG	BU
TC2014	Ephoron album	B	B	Insecta	Ephemeroptera	Polymitarcyidae		2	2	CG	BU
TC2015	Ephoron leukon	B	B	Insecta	Ephemeroptera	Polymitarcyidae		2	2	CG	BU
TC1924	Ephydra	B	B	Insecta	Diptera	Ephydridae		8	6	CG	SP
TC1928	Ephydridae	O	O	Insecta	Diptera	Ephydridae		6	6	CG	SP
TC1691	Epitheca	O	O	Insecta	Odonata	Cordulegastridae		8	3	PR	SP

Table 3. continued

Taxacode	FinalID	Qaid	Qaid1	Class	Order	Family	Tribe	TolVal	FamTolVal	FFG	Habit
TC1690	Epitheca princeps	B	B	Insecta	Odonata	Cordulegastridae		8	3	PR	SP
TC1644	Epoicocladius	O	O	Insecta	Diptera	Chironomidae	Orthocladiinae	3	.	CG	SP
TC1959	Erioptera	B	B	Insecta	Diptera	Tipulidae		6	3	SH	BU
TC1958	Erioptera knabi	B	B	Insecta	Diptera	Tipulidae		8	3	SH	BU
TC1953	Eristalis	B	B	Insecta	Diptera	Syrphidae		10	10	SH	BU
TC1701	Erpetogomphus	O	O	Insecta	Odonata	Gomphidae		6	1	PR	BU
TC1700	Erpetogomphus designatus	B	B	Insecta	Odonata	Gomphidae		6	1	PR	BU
TC1376	Erpobdella	O	X	Hirudinea	Pharyngobdellida	Erpobdellidae		5	.	PR	CN
TC0343	Erpobdella punctata	O	O	Hirudinea	Arhynchobdellida	Erpobdellidae		8	.	PR	SW
TC0185	Erpobdellidae	A	A	Hirudinea	Arhynchobdellida	Erpobdellidae		10	.	PR	CN
TC1715	Erythemis	O	O	Insecta	Odonata	Libellulidae		7	9	PR	CB
TC0239	Eubrianax	B	B	Insecta	Coleoptera	Psephenidae		4	.	SC	CB
TC0240	Eubrianax edwardsi	B	B	Insecta	Coleoptera	Psephenidae		4	.	SC	CN
TC0077	Eukiefferiella	O	O	Insecta	Diptera	Chironomidae	Orthocladiinae	8	8	CG	SP
TC1645	Eukiefferiella claripennis	B	B	Insecta	Diptera	Chironomidae	Orthocladiinae	8	8	CG	SP
TC1947	Euparyphus	B	B	Insecta	Diptera	Stratiomyidae		8	.	PR	SP
TC3234	Fallceon	O	O	Insecta	Ephemeroptera	Baetidae		5	.	CG	SP
TC2194	Ferrissia	O	X	Gastropoda	Pulmonata	Ancylidae		8	.	SC	CN
TC2191	Ferrissia fragilis	B	X	Gastropoda	Pulmonata	Ancylidae		6	.	SC	CN
TC2192	Ferrissia kirklandi	B	X	Gastropoda	Pulmonata	Ancylidae		6	.	SC	CN
TC2193	Ferrissia rivularis	B	X	Gastropoda	Pulmonata	Ancylidae		8	.	SC	CN
TC1586	Forcipomyia	B	B	Insecta	Diptera	Ceratopogonidae		6	6	SC	SP
TC2171	Fossaria	O	X	Gastropoda	Basommatophora	Lymnaeidae		8	.	SC	SP
TC2168	Fossaria bulimoides	B	X	Gastropoda	Basommatophora	Lymnaeidae		8	.	SC	SP
TC2169	Fossaria humilis	B	X	Gastropoda	Basommatophora	Lymnaeidae		4	.	SC	SP
TC2170	Fossaria obtussa	B	X	Gastropoda	Basommatophora	Lymnaeidae		4	.	SC	SP
TC2155	Fredericella sultana	B	X	Ectoprocta	Phylactolaemata	Fredericellidae		6	.	CF	CN
TC2156	Fredericellidae	B	X	Ectoprocta	Phylactolaemata	Fredericellidae		6	.	CF	CN
TC2223	Fusconaia flava	O	X	Pelecypoda	Unionoida	Unionidae		4	.	CF	BU

Table 3. continued

Taxacode	FinalID	Qaid	Qaid1	Class	Order	Family	Tribe	TolVal	FamTolVal	FFG	Habit
TC1511	Galerucella	B	B	Insecta	Coleoptera	Chrysomelidae		6	.	SH	SP
TC1490	Gammaridae	A	A	Crustacea	Amphipoda	Gammaridae		3	4	CG	SW
TC1489	Gammarus	O	O	Crustacea	Amphipoda	Gammaridae		3	4	CG	SW
TC1488	Gammarus lacustris	B	B	Crustacea	Amphipoda	Gammaridae		3	4	CG	SW
TC2210	Gastropoda	A	X	Gastropoda				8	.	SC	SP
TC2033	Gelastocoris	B	X	Insecta	Hemiptera	Gelastocridae		8	.	PR	SK
TC2032	Gelastocoris oculatus	B	X	Insecta	Hemiptera	Gelastocridae		8	.	PR	SK
TC2034	Gelastocridae	O	X	Insecta	Hemiptera	Gelastocridae		8	.	PR	SK
TC2042	Gerridae	O	X	Insecta	Hemiptera	Gerridae		8	.	PR	SK
TC2035	Gerris	B	X	Insecta	Hemiptera	Gerridae		8	.	PR	SK
TC1389	Glossiphonia	O	X	Hirudinea	Rhynchobdellida	Glossiphoniidae		6	.	PR	CN
TC1383	Glossiphonia complanata	B	X	Hirudinea	Rhynchobdellida	Glossiphoniidae		2	.	PR	CN
TC0187	Glossiphoniidae	A	X	Hirudinea	Rhynchobdellida	Glossiphoniidae		8	.	PR	SW
TC1773	Glossosoma	O	O	Insecta	Trichoptera	Glossosomatidae		0	0	SC	CN
TC1775	Glossosomatidae	A	A	Insecta	Trichoptera	Glossosomatidae		1	0	SC	CN
TC1646	Glyptotendipes	O	O	Insecta	Diptera	Chironomidae	Chironomini	10	10	CF	BU
TC1647	Goeldichironomus	O	O	Insecta	Diptera	Chironomidae	Chironomini	10	8	CG	BU
TC1709	Gomphidae	A	A	Insecta	Odonata	Gomphidae		5	1	PR	BU
TC1702	Gomphurus	O	O	Insecta	Odonata	Gomphidae		6	1	PR	BU
TC0393	Gomphus	O	O	Insecta	Odonata	Gomphidae		5	1	PR	BU
TC2276	Gordiidae	A	X	Gordioda	Gordiidea	Gordiidae		6	.	UN	UN
TC2278	Gordiidea	A	X	Gordioda	Gordiidea			6	.	UN	UN
TC2275	Gordius	O	X	Gordioda	Gordiidea	Gordiidae		6	.	UN	UN
TC0363	Graphoderus	B	B	Insecta	Coleoptera	Dytiscidae		4	.	PR	SW
TC2202	Gyraulus	O	X	Gastropoda	Pulmonata	Planorbidae		4	.	SC	SP
TC2200	Gyraulus circumstriatus	B	X	Gastropoda	Pulmonata	Planorbidae		6	.	SC	SP
TC2201	Gyraulus parvus	B	X	Gastropoda	Pulmonata	Planorbidae		4	.	SC	SP
TC1540	Gyretes	B	B	Insecta	Coleoptera	Gyrinidae		4	.	PR	CB
TC0225	Gyrinidae	O	O	Insecta	Coleoptera	Gyrinidae		4	.	PR	SW

Table 3. continued

Taxacode	FinalID	Qaid	Qaid1	Class	Order	Family	Tribe	TolVal	FamTolVal	FFG	Habit
TC0227	Gyrinus	B	B	Insecta	Coleoptera	Gyrinidae		4	.	PR	SW
TC1541	Gyrinus parcus	B	B	Insecta	Coleoptera	Gyrinidae		4	.	PR	SW
TC1412	Haemonais	O	X	Oligochaeta	Haplotaxida	Naididae		6	.	CG	CN
TC1413	Haemonais waldvogeli	B	X	Oligochaeta	Haplotaxida	Naididae		6	.	CG	CN
TC1368	Haemopis	O	X	Hirudinea	Gnathobdellida	Hirudinidae		5	.	PR	CN
TC1369	Haemopis grandis	B	X	Hirudinea	Gnathobdellida	Hirudinidae		5	.	PR	CN
TC1370	Haemopis marmorata	B	X	Hirudinea	Gnathobdellida	Hirudinidae		5	.	PR	CN
TC1371	Haemopis terrestris	B	X	Hirudinea	Gnathobdellida	Hirudinidae		5	.	PR	CN
TC0228	Haliplidae	O	O	Insecta	Coleoptera	Haliplidae		5	.	SC	CN
TC0082	Haliplus	B	B	Insecta	Coleoptera	Haliplidae		5	.	SC	CN
TC1648	Halocladius	O	O	Insecta	Diptera	Chironomidae	Orthocladiinae	2	6	CG	SP
TC0345	Haplotaxidae	A	A	Oligochaeta	Haplotaxida	Haplotaxidae			.	CG	CN
TC0355	Haplotaxis	O	X	Oligochaeta	Haplotaxida	Haplotaxidae		7	.	CG	CN
TC1396	Haplotaxis gordioides	B	X	Oligochaeta	Haplotaxida	Haplotaxidae		6	.	CG	CN
TC1649	Harnischia	O	O	Insecta	Diptera	Chironomidae	Chironomini	3	8	CG	SP
TC1650	Heleniella	O	O	Insecta	Diptera	Chironomidae	Orthocladiinae	1	6	CG	SP
TC1514	Helichus	B	B	Insecta	Coleoptera	Dryopidae		6	5	SH	CB
TC1778	Helicopsyche	O	O	Insecta	Trichoptera	Helicopsychidae		3	3	SC	CN
TC1776	Helicopsyche borealis	B	B	Insecta	Trichoptera	Helicopsychidae		3	3	SC	CN
TC1777	Helicopsyche piora	B	B	Insecta	Trichoptera	Helicopsychidae		3	3	SC	CN
TC1779	Helicopsychidae	A	A	Insecta	Trichoptera	Helicopsychidae		3	3	SC	CN
TC2204	Helisoma	O	X	Gastropoda	Pulmonata	Planorbidae		7	.	SC	SP
TC2203	Helisoma anceps	B	X	Gastropoda	Pulmonata	Planorbidae		7	.	SC	SP
TC2205	Helisoma trivolvis	B	X	Gastropoda	Pulmonata	Planorbidae		7	.	SC	SP
TC1960	Helius	B	B	Insecta	Diptera	Tipulidae		6	3	SH	BU
TC3241	Helobata	B	B	Insecta	Coleoptera	Hydrophilidae		8	.	CG	SW
TC0188	Helobdella	A	X	Hirudinea	Rhynchobdellida	Glossiphoniidae		8	.	PR	CN
TC0189	Helobdella elongata	O	X	Hirudinea	Rhynchobdellida	Glossiphoniidae		10	.	PR	CN
TC1380	Helobdella fusca	O	X	Hirudinea	Rhynchobdellida	Glossiphoniidae		6	.	PR	CN

Table 3. continued

Taxacode	FinalID	Qaid	Qaid1	Class	Order	Family	Tribe	TolVal	FamTolVal	FFG	Habit
TC0084	Helobdella stagnalis	O	X	Hirudinea	Rhynchobdellida	Glossiphoniidae		6	.	PR	CN
TC1384	Helobdella triserialis	O	X	Hirudinea	Rhynchobdellida	Glossiphoniidae		4	.	PR	CN
TC3250	Helochares	B	B	Insecta	Coleoptera	Hydrophilidae		8	.	PR	BU
TC1556	Helophorus	B	B	Insecta	Coleoptera	Hydrophilidae		8	.	SH	SW
TC0085	Hemerodromia	B	B	Insecta	Diptera	Empididae		6	6	PR	CN
TC2078	Hemiptera	A	A	Insecta	Hemiptera				.		
TC0086	Heptagenia	O	O	Insecta	Ephemeroptera	Heptageniidae		4	3	SC	CN
TC1985	Heptagenia diabasia	B	B	Insecta	Ephemeroptera	Heptageniidae		3	3	SC	CN
TC1986	Heptagenia elegantula	B	B	Insecta	Ephemeroptera	Heptageniidae		4	3	SC	CN
TC1987	Heptagenia flavescens	B	B	Insecta	Ephemeroptera	Heptageniidae		4	3	SC	CN
TC1988	Heptagenia maculipennis	B	B	Insecta	Ephemeroptera	Heptageniidae		4	3	SC	CN
TC1989	Heptagenia marginalis	B	B	Insecta	Ephemeroptera	Heptageniidae		4	3	SC	CN
TC2004	Heptageniidae	A	A	Insecta	Ephemeroptera	Heptageniidae		4	3	SC	CN
TC2044	Herbridae	O	X	Insecta	Hemiptera	Herbridae		8	.	PR	SK
TC3270	Hesperocorixa	B	X	Insecta	Hemiptera	Corixidae		10	.	PR	SW
TC1835	Hesperophylax	O	O	Insecta	Trichoptera	Limnephilidae		4	4	SH	SP
TC2108	Hetaerina	O	O	Insecta	Odonata	Calopterygidae		6	6	PR	CB
TC2107	Hetaerina americana	B	B	Insecta	Odonata	Calopterygidae		6	5	PR	CB
TC0414	Heterelmis	B	B	Insecta	Coleoptera	Elmidae		4	4	CG	CN
TC1542	Heteroceridae	O	O	Insecta	Coleoptera	Heteroceridae		8	.	SH	CN
TC1970	Heterocloeon	O	O	Insecta	Ephemeroptera	Baetidae		1	4	SC	SW
TC2079	Heteroptera	A	X	Insecta	Heteroptera			6	.	PR	SP
TC1651	Heterotrissocladius	O	O	Insecta	Diptera	Chironomidae	Orthocladiinae	1	0	CG	SP
TC0394	Hexagenia	O	O	Insecta	Ephemeroptera	Ephemeridae		4	6	SC	BU
TC1979	Hexagenia atrocaudata	B	B	Insecta	Ephemeroptera	Ephemeridae		4	6	SC	BU
TC1980	Hexagenia bilineata	B	B	Insecta	Ephemeroptera	Ephemeridae		6	6	SC	BU
TC1981	Hexagenia limbata	B	B	Insecta	Ephemeroptera	Ephemeridae		5	6	SC	BU
TC1982	Hexagenia rigida	B	B	Insecta	Ephemeroptera	Ephemeridae		4	6	SC	BU
TC0088	Hexatoma	B	B	Insecta	Diptera	Tipulidae		2	2	PR	BU

Table 3. continued

Taxacode	FinalID	Qaid	Qaid1	Class	Order	Family	Tribe	TolVal	FamTolVal	FFG	Habit
TC0089	Hirudinea	A	X	Hirudinea	Hirudinea	Hirudinea		10	.	PR	CN
TC1367	Hirudinidae	A	X	Hirudinea	Gnathobdellida	Hirudinidae		6	.	PR	CN
TC1543	Histeridae	O	O	Insecta	Coleoptera	Histeridae		8	.	SH	CN
TC2284	Holonemertea	B	B	Enopla	Holonemertea			6	.	CG	SP
TC2008	Homoeoneuria	O	O	Insecta	Ephemeroptera	Oligoneuriidae		3	2	CG	CN
TC2007	Homoeoneuria ammophila	B	B	Insecta	Ephemeroptera	Oligoneuriidae		3	2	CG	CN
TC1836	Homophylax	O	O	Insecta	Trichoptera	Limnephilidae		1	4	SH	SP
TC0395	Hyalella azteca	O	O	Crustacea	Amphipoda	Talitridae		8	4	CG	CN
TC1523	Hydaticus	B	B	Insecta	Coleoptera	Dytiscidae		5	.	PR	SW
TC1837	Hydatophylax	O	O	Insecta	Trichoptera	Limnephilidae		1	2	SH	SP
TC2164	Hydra	O	X	Hydrozoa	Hydroida	Clavidae		4	.	CG	CN
TC1544	Hydraenidae	B	B	Insecta	Coleoptera	Hydraenidae		4	.	SH	CN
TC1925	Hydrellia	B	B	Insecta	Diptera	Ephydridae		8	6	CG	SP
TC1653	Hydrobaenus	O	O	Insecta	Diptera	Chironomidae	Orthocladiinae	8	8	SC	SP
TC1652	Hydrobaenus pilipes	B	B	Insecta	Diptera	Chironomidae	Orthocladiinae	8	6	SC	SP
TC2181	Hydrobiidae	A	A	Gastropoda	Mesogastropoda	Hydrobiidae		4	.	SC	SP
TC3264	Hydrobiomorpha	B	B	Insecta	Coleoptera	Hydrophilidae		8	.	PR	SW
TC1557	Hydrobius	B	B	Insecta	Coleoptera	Hydrophilidae		8	.	PR	SW
TC1563	Hydrocanthus	B	B	Insecta	Coleoptera	Noteridae		7	.	CG	CB
TC3263	Hydrochara	B	B	Insecta	Coleoptera	Hydrophilidae		8	.	PR	SW
TC1558	Hydrochus	B	B	Insecta	Coleoptera	Hydrophilidae		8	.	SH	SW
TC2045	Hydrometra	B	X	Insecta	Hemiptera	Hydrometridae		8	.	PR	SK
TC2046	Hydrometridae	O	X	Insecta	Hemiptera	Hydrometridae		8	.	PR	SK
TC0091	Hydrophilidae	O	O	Insecta	Coleoptera	Hydrophilidae		5	.	PR	SW
TC0242	Hydrophilus	B	B	Insecta	Coleoptera	Hydrophilidae		5	.	PR	SW
TC3248	Hydroporinae	B	B	Insecta	Coleoptera	Dytiscidae		5	.	PR	SW
TC1524	Hydroporus	B	B	Insecta	Coleoptera	Dytiscidae		5	.	PR	SW
TC1525	Hydroporus undulatus	B	B	Insecta	Coleoptera	Dytiscidae		5	.	PR	SW
TC1798	Hydropsyche	A	A	Insecta	Trichoptera	Hydropsychidae		5	4	CF	CN

Table 3. continued

Taxacode	FinalID	Qaid	Qaid1	Class	Order	Family	Tribe	TolVal	FamTolVal	FFG	Habit
TC1788	Hydropsyche arinale	O	O	Insecta	Trichoptera	Hydropsychidae		4	4	CF	CN
TC1789	Hydropsyche betteni	O	O	Insecta	Trichoptera	Hydropsychidae		6	6	CF	CN
TC1790	Hydropsyche bidens	O	O	Insecta	Trichoptera	Hydropsychidae		5	4	CF	CN
TC1791	Hydropsyche cuanis	O	O	Insecta	Trichoptera	Hydropsychidae		4	4	CF	CN
TC1792	Hydropsyche elissoma	O	O	Insecta	Trichoptera	Hydropsychidae		4	4	CF	CN
TC1793	Hydropsyche frisoni	O	O	Insecta	Trichoptera	Hydropsychidae		4	4	CF	CN
TC1794	Hydropsyche incommoda	O	O	Insecta	Trichoptera	Hydropsychidae		5	7	CF	CN
TC1795	Hydropsyche occidentalis	O	O	Insecta	Trichoptera	Hydropsychidae		1	4	CF	CN
TC1796	Hydropsyche orris	O	O	Insecta	Trichoptera	Hydropsychidae		8	4	CF	CN
TC1797	Hydropsyche scalaris	O	O	Insecta	Trichoptera	Hydropsychidae		4	2	CF	CN
TC0415	Hydropsyche simulans	O	O	Insecta	Trichoptera	Hydropsychidae		4	4	CF	CN
TC1799	Hydropsyche venularis	O	O	Insecta	Trichoptera	Hydropsychidae		4	4	CF	CN
TC1804	Hydropsychidae	A	A	Insecta	Trichoptera	Hydropsychidae		5	4	CF	CN
TC1807	Hydroptila	O	O	Insecta	Trichoptera	Hydroptilidae		6	6	SC	CN
TC1818	Hydroptilidae	A	A	Insecta	Trichoptera	Hydroptilidae		4	4	SC	CN
TC1526	Hydrovatus	B	B	Insecta	Coleoptera	Dytiscidae		5	.	PR	SW
TC2167	Hydrozoa	A	X	Hydrozoa				5	.	CG	CN
TC1527	Hygrotus	B	B	Insecta	Coleoptera	Dytiscidae		5	.	PR	SW
TC1703	Hylogomphus	O	O	Insecta	Odonata	Gomphidae		6	1	PR	BU
TC2166	Hyroida	A	X	Hydrozoa	Hydroida			4	.	CG	CN
TC1528	Ilybius	B	B	Insecta	Coleoptera	Dytiscidae		5	.	PR	SW
TC1457	Ilyodrilus	O	O	Oligochaeta	Haplotaxida	Tubificidae		8	.	CG	BU
TC1458	Ilyodrilus templetoni	B	B	Oligochaeta	Haplotaxida	Tubificidae		8	.	CG	BU
TC2124	Ironoquia	O	O	Insecta	Trichoptera	Limnephilidae		3	3	SH	SP
TC2123	Ironoquia punctatissima	B	B	Insecta	Trichoptera	Limnephilidae		3	3	SH	SP
TC2118	Ischnura	O	O	Insecta	Odonata	Coenagrionidae		9	9	PR	CB
TC1459	Isochaetides	O	O	Oligochaeta	Haplotaxida	Tubificidae		6	.	CG	BU
TC1460	Isochaetides curvisetosus	B	B	Oligochaeta	Haplotaxida	Tubificidae		9	.	CG	BU
TC1755	Isogenoides	O	O	Insecta	Plecoptera	Perlodidae		2	.	PR	CN

Table 3. continued

Taxacode	FinalID	Qaid	Qaid1	Class	Order	Family	Tribe	TolVal	FamTolVal	FFG	Habit
TC1756	Isogenus	O	O	Insecta	Plecoptera	Perlodidae		2	2	PR	CN
TC0220	Isonychia	O	O	Insecta	Ephemeroptera	Oligoneuriidae		2	7	CG	SW
TC2021	Isonychia rufa	B	B	Insecta	Ephemeroptera	Oligoneuriidae		2	7	CG	SW
TC2022	Isonychia sicca	B	B	Insecta	Ephemeroptera	Oligoneuriidae		2	7	CG	SW
TC1757	Isoperla	O	O	Insecta	Plecoptera	Perlodidae		2	2	PR	CN
TC1507	Isopoda	A	A	Crustacea	Isopoda			6	.	SC	CN
TC0212	Isotomidae	B	X	Insecta	Collembola	Isotomidae		8	.	CG	CN
TC1572	Isotomurus	B	X	Insecta	Collembola	Isotomidae		8	.	CG	SK
TC1573	Isotomurus palustris	B	X	Insecta	Collembola	Isotomidae		8	.	CG	SK
TC1768	Japygidae	O	O	Insecta	Thysanura	Japygidae		6	.	CG	SP
TC1654	Kiefferulus	O	O	Insecta	Diptera	Chironomidae	Chironomini	10	8	CG	SP
TC3261	Labiobaetis	O	O	Insecta	Ephemeroptera	Baetidae		4	.	CG	CN
TC1655	Labrundinia	O	O	Insecta	Diptera	Chironomidae	Tanypodinae	4	7	PR	SP
TC1559	Laccobius	B	B	Insecta	Coleoptera	Hydrophilidae		4	.	PR	SW
TC1530	Laccophilus	B	B	Insecta	Coleoptera	Dytiscidae		8	.	PR	SW
TC1529	Laccophilus fasciatus	B	B	Insecta	Coleoptera	Dytiscidae		8	.	PR	SW
TC2009	Lachlania	O	O	Insecta	Ephemeroptera	Oligoneuriidae		3	.	CG	CN
TC1716	Ladona	O	O	Insecta	Odonata	Libellulidae		4	9	PR	SP
TC2228	Lampsilis	O	X	Pelecypoda	Unionoida	Unionidae		4	.	CF	BU
TC2224	Lampsilis ovata	O	X	Pelecypoda	Unionoida	Unionidae		4	.	CF	BU
TC2225	Lampsilis ovata ventricosa	O	X	Pelecypoda	Unionoida	Unionidae		2	.	CF	BU
TC2226	Lampsilis radiata	O	X	Pelecypoda	Unionoida	Unionidae		4	.	CF	BU
TC2227	Lampsilis radiata siloquoidea	O	X	Pelecypoda	Unionoida	Unionidae		4	.	CF	BU
TC2229	Lampsilis teres	O	X	Pelecypoda	Unionoida	Unionidae		4	.	CF	BU
TC1656	Larsia	O	O	Insecta	Diptera	Chironomidae	Tanypodinae	6	6	PR	SP
TC2232	Lasmigona	O	X	Pelecypoda	Unionoida	Unionidae		4	.	CF	BU
TC2230	Lasmigona complanata	O	X	Pelecypoda	Unionoida	Unionidae		4	.	CF	BU
TC2231	Lasmigona costata	O	X	Pelecypoda	Unionoida	Unionidae		4	.	CF	BU
TC1657	Lauterborniella	O	O	Insecta	Diptera	Chironomidae	Chironomini	6	8	CG	SP

Table 3. continued

Taxacode	FinalID	Qaid	Qaid1	Class	Order	Family	Tribe	TolVal	FamTolVal	FFG	Habit
TC2082	Lepidoptera	A	X	Insecta	Lepidoptera			5	.	CG	SP
TC1819	Lepidostoma	O	O	Insecta	Trichoptera	Lepidostomatidae		1	1	SH	CB
TC1832	Leptoceridae	A	A	Insecta	Trichoptera	Leptoceridae		4	4	CG	CN
TC1822	Leptocerus	O	O	Insecta	Trichoptera	Leptoceridae		4	4	CG	CN
TC1821	Leptocerus americanus	B	B	Insecta	Trichoptera	Leptoceridae		4	4	CG	CN
TC2233	Leptodea fragilis	O	X	Pelecypoda	Unionoida	Unionidae		4	.	CF	BU
TC2006	Leptophlebia	O	O	Insecta	Ephemeroptera	Leptophlebiidae		1	4	CG	SW
TC0101	Leptophlebiidae	A	A	Insecta	Ephemeroptera	Leptophlebiidae		2	4	GC	
TC0347	Leptotarsus	B	B	Insecta	Diptera	Tipulidae		8	.	SH	BU
TC1712	Lestes	O	O	Insecta	Odonata	Lestidae		8	.	PR	CB
TC2026	Lethocerus	O	X	Insecta	Hemiptera	Belostomatidae		4	.	PR	SW
TC2025	Lethocerus americana	B	X	Insecta	Hemiptera	Belostomatidae		4	.	PR	SW
TC2027	Lethocerus uhleri	B	X	Insecta	Hemiptera	Belostomatidae		4	.	PR	SW
TC1717	Leucorrhinia	O	O	Insecta	Odonata	Libellulidae		6	9	PR	SP
TC1809	Leucotrichia	O	O	Insecta	Trichoptera	Hydroptilidae		4	2	SC	CN
TC1808	Leucotrichia pictipes	B	B	Insecta	Trichoptera	Hydroptilidae		4	2	SC	CN
TC1990	Leucrocuta	O	O	Insecta	Ephemeroptera	Heptageniidae		2	0	CG	SW
TC1737	Leuctridae	A	A	Insecta	Plecoptera	Leuctridae		8	0	PR	SP
TC1719	Libellula	O	O	Insecta	Odonata	Libellulidae		8	9	PR	SP
TC1718	Libellula luctuosa	B	B	Insecta	Odonata	Libellulidae		8	9	PR	SP
TC1725	Libellulidae	A	A	Insecta	Odonata	Libellulidae		8	9	PR	SP
TC2235	Ligumia	O	X	Pelecypoda	Unionoida	Unionidae		4	.	CF	BU
TC2234	Ligumia recta	O	X	Pelecypoda	Unionoida	Unionidae		4	.	CF	BU
TC2236	Ligumia subrostrata	O	X	Pelecypoda	Unionoida	Unionidae		4	.	CF	BU
TC2130	Limnephilidae	A	A	Insecta	Trichoptera	Limnephilidae			4	SH	SP
TC2125	Limnephilus	O	O	Insecta	Trichoptera	Limnephilidae		1	4	SH	SP
TC1562	Limnichidae	O	O	Insecta	Coleoptera	Limnichidae		6	.	SC	CB
TC1463	Limnodrilus	O	O	Oligochaeta	Haplotaxida	Tubificidae		9	.	CG	BU
TC1461	Limnodrilus cervix	B	B	Oligochaeta	Haplotaxida	Tubificidae		9	.	CG	BU

Table 3. continued

Taxacode	FinalID	Qaid	Qaid1	Class	Order	Family	Tribe	TolVal	FamTolVal	FFG	Habit
TC0427	Limnodrilus claparedianus	B	B	Oligochaeta	Haplotaxida	Tubificidae		9	.	CG	BU
TC0428	Limnodrilus hoffmeisteri	B	B	Oligochaeta	Haplotaxida	Tubificidae		9	.	CG	BU
TC1462	Limnodrilus profundicola	B	B	Oligochaeta	Haplotaxida	Tubificidae		9	.	CG	BU
TC1464	Limnodrilus udekemianus	B	B	Oligochaeta	Haplotaxida	Tubificidae		7	.	CG	BU
TC0106	Limnophila	B	B	Insecta	Diptera	Tipulidae		2	3	PR	BU
TC1929	Limnophora	B	B	Insecta	Diptera	Muscidae		8	6	PR	BU
TC1659	Limnophyes	O	O	Insecta	Diptera	Chironomidae	Orthocladiinae	3	6	CG	SP
TC2036	Limnoporus	B	X	Insecta	Hemiptera	Gerridae		8	.	PR	SK
TC1961	Limonia	B	B	Insecta	Diptera	Tipulidae		6	3	SH	BU
TC1532	Liodessus	B	B	Insecta	Coleoptera	Dytiscidae		5	.	PR	SW
TC1531	Liodessus affinis	B	B	Insecta	Coleoptera	Dytiscidae		5	.	PR	SW
TC3251	Lipogomphus	O	O	Insecta	Heteroptera	Hebridae		8	.	PR	SP
TC1505	Lirceus	O	O	Crustacea	Isopoda	Asellidae		6	8	SC	CN
TC3258	Lispe	B	B	Insecta	Diptera	Muscidae		9	.	PR	SP
TC1660	Lopescladius	O	O	Insecta	Diptera	Chironomidae	Orthocladiinae	2	4	SC	SP
TC1397	Lumbricidae	O	O	Oligochaeta	Haplotaxida	Lumbricidae		8	.	CG	BU
TC0107	Lumbriculidae	O	X	Oligochaeta	Lumbriculida	Lumbriculidae		8	.	CG	BU
TC1476	Lumbriculus	B	X	Oligochaeta	Lumbriculida	Lumbriculidae		9	.	CG	BU
TC1477	Lumbriculus variegatus	B	X	Oligochaeta	Lumbriculida	Lumbriculidae		9	.	CG	BU
TC2172	Lymnaea	O	X	Gastropoda	Basommatophora	Lymnaeidae		2	.	SC	SP
TC2173	Lymnaea stagnalis	B	X	Gastropoda	Basommatophora	Lymnaeidae		2	.	SC	SP
TC2177	Lymnaeidae	A	X	Gastropoda	Basommatophora	Lymnaeidae		2	.	SC	SP
TC2149	Lype	O	O	Insecta	Trichoptera	Psychomyiidae		2	2	SC	SP
TC0364	Macdunnoa	O	O	Insecta	Ephemeroptera	Heptageniidae		1	.	SC	CN
TC1366	Macrobdella	O	X	Hirudinea	Gnathobdellida	Hirudinidae		6	.	PR	CN
TC1372	Macrobdella decora	B	X	Hirudinea	Gnathobdellida	Hirudinidae		5	.	PR	CN
TC1375	Macrobdella detetra	B	X	Hirudinea	Gnathobdellida	Hirudinidae		5	.	PR	CN
TC1373	Macrobdella diplotertia	B	X	Hirudinea	Gnathobdellida	Hirudinidae		5	.	PR	CN
TC1374	Macrobdella ditetra	B	X	Hirudinea	Gnathobdellida	Hirudinidae		5	.	PR	CN

Table 3. continued

Taxacode	FinalID	Qaid	Qaid1	Class	Order	Family	Tribe	TolVal	FamTolVal	FFG	Habit
TC1728	Macromia	O	O	Insecta	Odonata	Macromiidae		4	2	PR	CB
TC1729	Macromiidae	A	A	Insecta	Odonata	Macromiidae		4	2	PR	CB
TC0234	Macronychus	B	B	Insecta	Coleoptera	Elmidae		4	4	SC	SP
TC3233	Macronychus glabratus	B	B	Insecta	Coleoptera	Elmidae		4	4	SC	SP
TC1661	Macropelopia	O	O	Insecta	Diptera	Chironomidae	Tanypodinae	6	6	PR	SP
TC1662	Macropelopiini	A	A	Insecta	Diptera	Chironomidae	Tanypodinae	6	6	PR	SP
TC1739	Malenka	O	O	Insecta	Plecoptera	Nemouridae		2	2	SH	SP
TC0396	Mallochohelea	B	B	Insecta	Diptera	Ceratopogonidae		6	6	PR	BU
TC1811	Mayatrichia	O	O	Insecta	Trichoptera	Hydroptilidae		6	4	SC	CN
TC1810	Mayatrichia ayama	B	B	Insecta	Trichoptera	Hydroptilidae		6	4	SC	CN
TC2237	Megalonaias gigantea	O	X	Pelecypoda	Unionoida	Unionidae		4	.	CF	BU
TC2092	Megaloptera	A	X	Insecta	Megaloptera				.		
TC2043	Merragata	O	X	Insecta	Hemiptera	Herbridae		8	.	PR	SK
TC2047	Mesovelia	B	X	Insecta	Hemiptera	Mesoveliidae		8	.	PR	SK
TC2048	Mesoveliidae	O	X	Insecta	Hemiptera	Mesoveliidae		8	.	PR	SK
TC3252	Metrichia	O	O	Insecta	Trichoptera	Hydroptilidae		4	.	SC	CB
TC2037	Metrobates	B	X	Insecta	Hemiptera	Gerridae		6	.	PR	SK
TC2038	Metrobates trux	B	X	Insecta	Hemiptera	Gerridae		6	.	PR	SK
TC2068	Micracanthia	B	X	Insecta	Hemiptera	Saldidae		4	.	PR	CB
TC1663	Microchironomus	O	O	Insecta	Diptera	Chironomidae	Chironomini	6	8	CG	BU
TC1536	Microcylloepus	B	B	Insecta	Coleoptera	Elmidae		6	3	CG	CN
TC3237	Microcylloepus pusillus	B	B	Insecta	Coleoptera	Elmidae		6	3	CG	CN
TC1664	Micropsectra	O	O	Insecta	Diptera	Chironomidae	Tanytarsini	8	7	CG	CB
TC1665	Microtendipes	O	O	Insecta	Diptera	Chironomidae	Chironomini	5	8	CG	SP
TC2073	Microvelia	B	X	Insecta	Hemiptera	Veliidae		8	.	PR	SK
TC2072	Microvelia hunei	B	X	Insecta	Hemiptera	Veliidae		8	.	PR	SK
TC2133	Molanna	O	O	Insecta	Trichoptera	Molannidae		1	6	SC	SP
TC2134	Molannidae	A	A	Insecta	Trichoptera	Molannidae		1	6	SC	SP
TC3242	Molophilus	B	B	Insecta	Diptera	Tipulidae		9	.	SH	BU

Table 3. continued

Taxacode	FinalID	Qaid	Qaid1	Class	Order	Family	Tribe	TolVal	FamTolVal	FFG	Habit
TC0186	Mooreobdella	O	O	Hirudinea	Arhynchobdellida	Erpobdellidae		8	.	PR	CN
TC0362	Mooreobdella fervida	B	B	Hirudinea	Arhynchobdellida	Erpobdellidae		10	.	PR	CN
TC1377	Mooreobdella microstoma	O	X	Hirudinea	Pharyngobdellida	Erpobdellidae		5	.	PR	CN
TC2126	Moselyana	O	O	Insecta	Trichoptera	Limnephilidae		4	4	CG	CN
TC1930	Muscidae	O	O	Insecta	Diptera	Muscidae		8	6	PR	SP
TC0397	Musculium	O	X	Pelecypoda	Veneroida	Pisidiidae		5	.	CF	UN
TC2260	Musculium lacustre	B	X	Pelecypoda	Veneroida	Pisidiidae		8	.	CF	BU
TC2261	Musculium partumeium	B	X	Pelecypoda	Veneroida	Pisidiidae		8	.	CF	BU
TC2262	Musculium securis	B	X	Pelecypoda	Veneroida	Pisidiidae		8	.	CF	BU
TC0416	Musculium transversum	B	X	Pelecypoda	Veneroida	Pisidiidae		8	.	CF	BU
TC1948	Myxosargus	B	B	Insecta	Diptera	Stratiomyidae		8	.	PR	SP
TC1387	Myzobdella	O	X	Hirudinea	Rhynchobdellida	Piscicolidae		7	.	PR	CB
TC0192	Myzobdella lugubris	B	X	Hirudinea	Rhynchobdellida	Piscicolidae		7	.	PR	CB
TC0110	Naididae	A	A	Oligochaeta	Haplotaxida	Naididae		8	.	CG	SP
TC0429	Nais	O	O	Oligochaeta	Haplotaxida	Naididae		9	.	CG	BU
TC1414	Nais alpina	B	B	Oligochaeta	Haplotaxida	Naididae		6	.	CG	CB
TC1415	Nais barbata	B	B	Oligochaeta	Haplotaxida	Naididae		8	.	CG	CN
TC1416	Nais behningi	B	B	Oligochaeta	Haplotaxida	Naididae		6	.	CG	CN
TC1417	Nais bretscheri	B	B	Oligochaeta	Haplotaxida	Naididae		6	.	CG	CN
TC1418	Nais communis	B	B	Oligochaeta	Haplotaxida	Naididae		8	.	CG	CN
TC1419	Nais elinguis	B	B	Oligochaeta	Haplotaxida	Naididae		9	.	CG	CN
TC1420	Nais pardalis	B	B	Oligochaeta	Haplotaxida	Naididae		8	.	CG	CN
TC1421	Nais pseudobtusa	B	B	Oligochaeta	Haplotaxida	Naididae		6	.	CG	CN
TC1422	Nais simplex	B	B	Oligochaeta	Haplotaxida	Naididae		6	.	CG	CN
TC1423	Nais variabilis	B	B	Oligochaeta	Haplotaxida	Naididae		9	.	CG	CN
TC1666	Nanocladius	O	O	Insecta	Diptera	Chironomidae	Orthocladiinae	2	3	CG	SP
TC2103	Nasiaeschna pentacantha	O	O	Insecta	Odonata	Aeshnidae		8	6	PR	CB
TC2053	Naucoridae	O	X	Insecta	Hemiptera	Naucoridae		8	.	PR	CN
TC3255	Nebrioporus	B	B	Insecta	Coleoptera	Dytiscidae		8	.	PR	SW

Table 3. continued

Taxacode	FinalID	Qaid	Qaid1	Class	Order	Family	Tribe	TolVal	FamTolVal	FFG	Habit
TC0417	Nectopsyche	O	O	Insecta	Trichoptera	Leptoceridae		3	3	SC	SP
TC1823	Nectopsyche albida	O	O	Insecta	Trichoptera	Leptoceridae		3	3	SC	SP
TC1824	Nectopsyche candida	O	O	Insecta	Trichoptera	Leptoceridae		3	3	SC	SP
TC1825	Nectopsyche diarina	O	O	Insecta	Trichoptera	Leptoceridae		3	3	SC	SP
TC1826	Nectopsyche pavida	O	O	Insecta	Trichoptera	Leptoceridae		3	3	SC	SP
TC2119	Nehalennia	O	O	Insecta	Odonata	Coenagrionidae		8	9	PR	SP
TC0422	Nematoda	O	X					5	.	UN	BU
TC2279	Nematomorpha	O	X					6	.	UN	UN
TC2286	Nemertea	A	X					6	.	CG	SP
TC3240	Nemotelus	B	B	Insecta	Diptera	Stratiomyidae		8	.	CG	SW
TC1740	Nemoura	O	O	Insecta	Plecoptera	Nemouridae		1	2	SH	SP
TC1743	Nemouridae	A	A	Insecta	Plecoptera	Nemouridae		1	2	SH	SP
TC0113	Neoelmis	B	B	Insecta	Coleoptera	Elmidae		4	4	SC	CN
TC2039	Neogerris hesione	B	X	Insecta	Hemiptera	Gerridae		8	.	PR	SK
TC1749	Neoperla	O	O	Insecta	Plecoptera	Perlidae		2	1	PR	CN
TC1748	Neoperla clymene	B	B	Insecta	Plecoptera	Perlidae		2	1	PR	CN
TC2127	Neophylax	O	O	Insecta	Trichoptera	Limnephilidae		4	3	CG	CN
TC2064	Neoplea	B	X	Insecta	Hemiptera	Pleidae		8	.	PR	SW
TC2065	Neoplea striola	B	X	Insecta	Hemiptera	Pleidae		8	.	PR	SW
TC1812	Neotrichia	O	O	Insecta	Trichoptera	Hydroptilidae		4	4	SH	CN
TC1667	Neozavrelia	O	O	Insecta	Diptera	Chironomidae	Tanytarsini	6	6	CG	BU
TC2055	Nepa	B	X	Insecta	Hemiptera	Nepidae		4	.	PR	CN
TC2054	Nepa apiculata	B	X	Insecta	Hemiptera	Nepidae		4	.	PR	CN
TC2061	Nepidae	O	X	Insecta	Hemiptera	Nepidae		6	.	PR	CN
TC2083	Nepticulidae	O	X	Insecta	Lepidoptera	Nepticulidae		6	.	SH	CB
TC2145	Neureclipsis	O	O	Insecta	Trichoptera	Polycentropodidae		6	7	CF	CN
TC1694	Neurocordulia	O	O	Insecta	Odonata	Corduliidae		4	5	PR	SP
TC1668	Nilotanypus	O	O	Insecta	Diptera	Chironomidae	Tanypodinae	4	6	PR	SP
TC1669	Nimbocera	O	O	Insecta	Diptera	Chironomidae	Tanytarsini	6	.	CF	SP

Table 3. continued

Taxacode	FinalID	Qaid	Qaid1	Class	Order	Family	Tribe	TolVal	FamTolVal	FFG	Habit
TC1670	Nimbocera pinderi	B	B	Insecta	Diptera	Chironomidae	Tanytarsini	6	.	CF	SP
TC2084	Noctuidae	O	X	Insecta	Lepidoptera	Noctuidae		6	.	SC	CB
TC1565	Noteridae	O	O	Insecta	Coleoptera	Noteridae		6	.	PR	CB
TC2062	Notonecta	B	X	Insecta	Hemiptera	Notonectidae		8	.	PR	SW
TC2063	Notonectidae	O	X	Insecta	Hemiptera	Notonectidae		8	.	PR	SW
TC1509	Notostraca	A	X	Crustacea	Notostraca			6	.	SC	CN
TC0398	Nyctiophylax	O	O	Insecta	Trichoptera	Polycentropodidae		2	5	CF	CN
TC2238	Obliquaria reflexa	O	X	Pelecypoda	Unionoida	Unionidae		4	.	CF	BU
TC1813	Ochrotrichia	O	O	Insecta	Trichoptera	Hydroptilidae		4	4	SC	CB
TC1926	Ochthera	B	B	Insecta	Diptera	Ephydridae		8	6	CG	SP
TC1731	Odonata	A	A	Insecta	Odonata				.		
TC2135	Odontoceridae	O	O	Insecta	Trichoptera	Odontoceridae		5	3	PR	BU
TC1671	Odontomesa	O	O	Insecta	Diptera	Chironomidae	Diamesinae	0	4	CG	SP
TC1949	Odontomyia	B	B	Insecta	Diptera	Stratiomyidae		8	7	PR	BU
TC0399	Oecetis	O	O	Insecta	Trichoptera	Leptoceridae		3	4	PR	SP
TC1827	Oecetis avara	B	B	Insecta	Trichoptera	Leptoceridae		3	4	PR	CB
TC1828	Oecetis cinerascens	B	B	Insecta	Trichoptera	Leptoceridae		3	4	PR	CB
TC0118	Oligochaeta	A	A	Oligochaeta	Oligochaeta	Oligochaeta		5	.	GC	
TC2010	Oligoneuriidae	A	A	Insecta	Ephemeroptera	Oligoneuriidae		3	2	CG	CN
TC0348	Ophidonais	O	O	Oligochaeta	Haplotaxida	Naididae		10	.	CG	BU
TC0119	Ophidonais serpentina	B	B	Oligochaeta	Haplotaxida	Naididae		6	.	CG	BU
TC1704	Ophiogomphus	O	O	Insecta	Odonata	Gomphidae		4	1	PR	BU
TC0121	Optioservus	B	B	Insecta	Coleoptera	Elmidae		4	4	SC	SP
TC1497	Orconectes	B	B	Crustacea	Decapoda	Cambaridae		8	.	SC	SP
TC1495	Orconectes immunis	B	B	Crustacea	Decapoda	Cambaridae		4	.	SC	SP
TC1496	Orconectes nais	B	B	Crustacea	Decapoda	Cambaridae		8	.	SC	SP
TC1498	Orconectes virilis	B	B	Crustacea	Decapoda	Cambaridae		8	.	SC	SP
TC3239	Oreodytes	B	B	Insecta	Coleoptera	Dytiscidae		7	.	PR	SW
TC1963	Ormosia	B	B	Insecta	Diptera	Tipulidae		6	3	SH	BU

Table 3. continued

Taxacode	FinalID	Qaid	Qaid1	Class	Order	Family	Tribe	TolVal	FamTolVal	FFG	Habit
TC1962	Ormosia arculata	B	B	Insecta	Diptera	Tipulidae		6	3	SH	BU
TC1672	Orthocladiinae	A	A	Insecta	Diptera	Chironomidae	Orthocladiinae	5	8		
TC1677	Orthocladius	O	O	Insecta	Diptera	Chironomidae	Orthocladiinae	6	6	CG	SP
TC1673	Orthocladius carlatus	O	O	Insecta	Diptera	Chironomidae	Orthocladiinae	2	2	CG	SP
TC1674	Orthocladius mallochi	O	O	Insecta	Diptera	Chironomidae	Orthocladiinae	4	6	CG	SP
TC1675	Orthocladius manitobensis	O	O	Insecta	Diptera	Chironomidae	Orthocladiinae	4	6	CG	SP
TC1676	Orthocladius obumbratus	O	O	Insecta	Diptera	Chironomidae	Orthocladiinae	8	6	CG	SP
TC1678	Orthocladius wiensi	O	O	Insecta	Diptera	Chironomidae	Orthocladiinae	4	6	CG	SP
TC1917	Orthopodomyia	O	O	Insecta	Diptera	Culicidae		6	.	CF	SW
TC1732	Orthoptera	O	X	Insecta	Orthoptera				.		
TC1816	Orthotrichia	O	O	Insecta	Trichoptera	Hydroptilidae		4	4	SC	CN
TC1814	Orthotrichia aegerfasciella	B	B	Insecta	Trichoptera	Hydroptilidae		4	4	SC	CN
TC1815	Orthotrichia cristata	B	B	Insecta	Trichoptera	Hydroptilidae		4	4	SC	CN
TC0235	Oulimnius	B	B	Insecta	Coleoptera	Elmidae		2	.	SC	CN
TC1950	Oxycera	B	B	Insecta	Diptera	Stratiomyidae		8	.	PR	CN
TC1817	Oxyethira	O	O	Insecta	Trichoptera	Hydroptilidae		6	4	SC	SP
TC1720	Pachydiplax longipennis	O	O	Insecta	Odonata	Libellulidae		9	9	PR	SP
TC1679	Pagastia	O	O	Insecta	Diptera	Chironomidae	Diamesinae	1	1	CG	SP
TC2013	Palingeniidae	A	A	Insecta	Ephemeroptera	Palingeniidae		3	2	CG	CN
TC2029	Palmacorixa	B	X	Insecta	Hemiptera	Corixidae		10	.	PR	SW
TC1575	Palpomyia	B	B	Insecta	Diptera	Ceratopogonidae		6	6	PR	BU
TC1721	Pantala	O	O	Insecta	Odonata	Libellulidae		6	9	PR	SP
TC1680	Parachaetocladius	O	O	Insecta	Diptera	Chironomidae	Orthocladiinae	3	6	CG	SP
TC1683	Parachironomus	O	O	Insecta	Diptera	Chironomidae	Chironomini	8	10	PR	SP
TC1681	Parachironomus abortivus	O	O	Insecta	Diptera	Chironomidae	Chironomini	8	10	PR	SP
TC1682	Parachironomus directus	O	O	Insecta	Diptera	Chironomidae	Chironomini	8	10	PR	SP
TC1684	Paracladius	O	O	Insecta	Diptera	Chironomidae	Orthocladiinae	1	6	CG	SP
TC0400	Paracladopelma	O	O	Insecta	Diptera	Chironomidae	Chironomini	7	7	CG	CN
TC1972	Paracloeodes	O	O	Insecta	Ephemeroptera	Baetidae		7	4	SC	SW

Table 3. continued

Taxacode	FinalID	Qaid	Qaid1	Class	Order	Family	Tribe	TolVal	FamTolVal	FFG	Habit
TC1971	Paracloeodes minutus	B	B	Insecta	Ephemeroptera	Baetidae		7	4	SC	SW
TC1560	Paracymus	B	B	Insecta	Coleoptera	Hydrophilidae		5	.	PR	CN
TC1750	Paragnetina	O	O	Insecta	Plecoptera	Perlidae		1	1	PR	CN
TC2277	Paragordius	O	X	Gordioda	Gordiidea	Gordiidae		6	.	UN	UN
TC1685	Parakiefferiella	O	O	Insecta	Diptera	Chironomidae	Orthocladiinae	4	6	CG	SP
TC1687	Paralauterborniella	O	O	Insecta	Diptera	Chironomidae	Chironomini	4	8	CG	SP
TC1686	Paralauterborniella nigrohalterale	B	B	Insecta	Diptera	Chironomidae	Chironomini	4	6	CG	SP
TC0123	Paraleptophlebia	O	O	Insecta	Ephemeroptera	Leptophlebiidae		1	1	CG	SW
TC1688	Paralimnophyes	O	O	Insecta	Diptera	Chironomidae	Orthocladiinae	9	6	CG	SP
TC1838	Parametriocnemus	O	O	Insecta	Diptera	Chironomidae	Orthocladiinae	2	5	CG	SP
TC1424	Paranais litoralis	O	O	Oligochaeta	Haplotaxida	Naididae		4	.	CG	CN
TC1839	Paraphaenocladius	O	O	Insecta	Diptera	Chironomidae	Orthocladiinae	1	6	CG	SP
TC2066	Paraplea	B	X	Insecta	Hemiptera	Pleidae		8	.	PR	SW
TC1840	Paratanytarsus	O	O	Insecta	Diptera	Chironomidae	Tanytarsini	6	6	CG	CN
TC1841	Paratendipes	O	O	Insecta	Diptera	Chironomidae	Chironomini	6	8	CG	SP
TC1927	Parydra	B	B	Insecta	Diptera	Ephydridae		8	6	CG	SP
TC0124	Pedicia	B	B	Insecta	Diptera	Tipulidae		6	3	PR	BU
TC2274	Pelecypoda	A	X	Pelecypoda					.	CF	BU
TC2052	Pelocoris	B	X	Insecta	Hemiptera	Naucoridae		4	.	PR	CN
TC2051	Pelocoris femoratus	B	X	Insecta	Hemiptera	Naucoridae		4	.	PR	CN
TC1515	Pelonomus obscurus	B	B	Insecta	Coleoptera	Dryopidae		6	5	SH	CB
TC1466	Peloscolex	O	O	Oligochaeta	Haplotaxida	Tubificidae		7	.	CG	BU
TC1465	Peloscolex multisetosus	B	B	Oligochaeta	Haplotaxida	Tubificidae		7	.	CG	BU
TC1467	Peloscolex superiorensis	B	B	Oligochaeta	Haplotaxida	Tubificidae		7	.	CG	BU
TC1468	Peloscolex variegatus	B	B	Oligochaeta	Haplotaxida	Tubificidae		7	.	CG	BU
TC0430	Peltodytes	B	B	Insecta	Coleoptera	Halipidae		8	.	SH	UN
TC1744	Peltoperla	O	O	Insecta	Plecoptera	Peltoperlidae		1	.	PR	CN
TC2011	Pentagenia	O	O	Insecta	Ephemeroptera	Palingeniidae		3	2	CG	BU
TC2012	Pentagenia vittigera	B	B	Insecta	Ephemeroptera	Palingeniidae		3	2	CG	BU

Table 3. continued

Taxacode	FinalID	Qaid	Qaid1	Class	Order	Family	Tribe	TolVal	FamTolVal	FFG	Habit
TC0125	Pentaneura	O	O	Insecta	Diptera	Chironomidae	Tanypodinae	6	6	PR	BU
TC1932	Pericoma	B	B	Insecta	Diptera	Psychodidae		6	10	CG	BU
TC1722	Perithemis	O	O	Insecta	Odonata	Libellulidae		10	9	PR	SP
TC1723	Perithemis tenera	B	B	Insecta	Odonata	Libellulidae		10	9	PR	SP
TC1752	Perlesta	O	O	Insecta	Plecoptera	Perlidae		4	5	PR	CN
TC1751	Perlesta placida	B	B	Insecta	Plecoptera	Perlidae		4	5	PR	CN
TC1753	Perlidae	A	A	Insecta	Plecoptera	Perlidae		4	1	PR	SP
TC1758	Perlodidae	A	A	Insecta	Plecoptera	Perlodidae		2	2	SH	CN
TC2080	Petrophila	B	X	Insecta	Lepidoptera	Pyralidae		6	5	SC	SP
TC1842	Phaenopsectra	O	O	Insecta	Diptera	Chironomidae	Chironomini	7	7	CG	SP
TC3256	Phasganophora	O	O	Insecta	Plecoptera	Perlidae		5	.	PR	CN
TC2141	Philopotamidae	O	O	Insecta	Trichoptera	Philopotamidae			3		
TC1931	Phoridae	O	O	Insecta	Diptera	Phoridae		10	6	CG	BU
TC2142	Phryganea	O	O	Insecta	Trichoptera	Phryganeidae		4	.	CG	CN
TC0401	Physa	O	X	Gastropoda	Pulmonata	Physidae		8	.	SC	SP
TC2198	Physella	O	X	Gastropoda	Pulmonata	Physidae		9	.	SC	SP
TC2196	Physella anatina	B	X	Gastropoda	Pulmonata	Physidae		9	.	SC	SP
TC2197	Physella hawnii	B	X	Gastropoda	Pulmonata	Physidae		9	.	SC	SP
TC2199	Physidae	A	X	Gastropoda	Pulmonata	Physidae		9	.	SC	SP
TC1425	Piguetiella	O	O	Oligochaeta	Haplotaxida	Naididae		6	.	CG	BU
TC1426	Piguetiella michiganensis	B	B	Oligochaeta	Haplotaxida	Naididae		6	.	CG	BU
TC1964	Pilaria	B	B	Insecta	Diptera	Tipulidae		4	3	CG	BU
TC0349	Piscicolidae	A	X	Hirudinea	Rhynchobdellida	Piscicolidae		7	.	PR	CN
TC2268	Pisidiidae	A	X	Pelecypoda	Veneroida	Pisidiidae		7	.	CF	BU
TC0402	Pisidium	O	X	Pelecypoda	Veneroida	Pisidiidae		7	.	CF	BU
TC2263	Pisidium adamsi	B	X	Pelecypoda	Veneroida	Pisidiidae		6	.	CF	BU
TC2264	Pisidium amnicum	B	X	Pelecypoda	Veneroida	Pisidiidae		4	.	CF	BU
TC2265	Pisidium casertanum	B	X	Pelecypoda	Veneroida	Pisidiidae		8	.	CF	BU
TC2266	Pisidium compressum	B	X	Pelecypoda	Veneroida	Pisidiidae		8	.	CF	BU

Table 3. continued

Taxacode	FinalID	Qaid	Qaid1	Class	Order	Family	Tribe	TolVal	FamTolVal	FFG	Habit
TC2267	Pisidium nitidum	B	X	Pelecypoda	Veneroida	Pisidiidae		8	.	CF	BU
TC0190	Placobdella	A	X	Hirudinea	Rhynchobdellida	Glossiphoniidae		8	.	PR	CN
TC0370	Placobdella hollensis	O	X	Hirudinea	Rhynchobdellida	Glossiphoniidae		10	.	PR	CN
TC0371	Placobdella montifera	O	X	Hirudinea	Rhynchobdellida	Glossiphoniidae		10	.	PR	CN
TC1385	Placobdella multilineata	O	X	Hirudinea	Rhynchobdellida	Glossiphoniidae		7	.	PR	CN
TC1381	Placobdella ornata	O	X	Hirudinea	Rhynchobdellida	Glossiphoniidae		6	.	PR	CN
TC0191	Placobdella papillifera	O	X	Hirudinea	Rhynchobdellida	Glossiphoniidae		6	.	PR	CN
TC1382	Placobdella parasitica	O	X	Hirudinea	Rhynchobdellida	Glossiphoniidae		6	.	PR	CN
TC2291	Planariidae	A	A	Turbellaria	Tricladida	Planariidae		6	.	CG	SP
TC2206	Planorbella	O	X	Gastropoda	Pulmonata	Planorbidae		6	.	SC	SP
TC2209	Planorbidae	A	X	Gastropoda	Pulmonata	Planorbidae		6	.	SC	SP
TC0403	Plathemis	O	O	Insecta	Odonata	Libelluidae		6	9	PR	SP
TC2128	Platycentropus	O	O	Insecta	Trichoptera	Limnephilidae		3	4	CG	CN
TC3254	Plauditus	O	O	Insecta	Ephemeroptera	Baetidae		4	.	SC	SP
TC1767	Plecoptera	A	A	Insecta	Plecoptera				.		
TC2067	Pleidae	O	X	Insecta	Hemiptera	Pleidae		8	.	PR	SW
TC2239	Pleurobema cordatum	O	X	Pelecypoda	Unionoida	Unionidae		4	.	CF	BU
TC2158	Plumatella	B	X	Ectoprocta	Phylactolaemata	Plumatellidae		6	.	CF	CN
TC2157	Plumatella repens	B	X	Ectoprocta	Phylactolaemata	Plumatellidae		6	.	CF	CN
TC2159	Plumatellidae	B	X	Ectoprocta	Phylactolaemata	Plumatellidae		6	.	CF	CN
TC1574	Podura	B	X	Insecta	Collembola	Poduridae		8	.	CG	SP
TC2148	Polycentropodidae	A	A	Insecta	Trichoptera	Polycentropodidae		4	6	PR	CN
TC2147	Polycentropus	O	O	Insecta	Trichoptera	Polycentropodidae		4	6	PR	CN
TC2146	Polycentropus centralis	B	B	Insecta	Trichoptera	Polycentropodidae		4	6	PR	CN
TC2018	Polymitarcyidae	A	A	Insecta	Ephemeroptera	Polymitarcyidae		3	2	CG	CN
TC0431	Polypedilum	A	A	Insecta	Diptera	Chironomidae	Chironomini	6	8	SH	SP
TC1843	Polypedilum aviceps	O	O	Insecta	Diptera	Chironomidae	Chironomini	4	8	CG	SP
TC1844	Polypedilum convictum	O	O	Insecta	Diptera	Chironomidae	Chironomini	4	8	SH	SP
TC1845	Polypedilum fallax	O	O	Insecta	Diptera	Chironomidae	Chironomini	6	8	SH	SP

Table 3. continued

Taxacode	FinalID	Qaid	Qaid1	Class	Order	Family	Tribe	TolVal	FamTolVal	FFG	Habit
TC1846	Polypedilum halterale	O	O	Insecta	Diptera	Chironomidae	Chironomini	7	8	SH	SP
TC0418	Polypedilum illinoense	O	O	Insecta	Diptera	Chironomidae	Chironomini	6	8	CG	SP
TC1847	Polypedilum laetum	O	O	Insecta	Diptera	Chironomidae	Chironomini	6	8	SH	SP
TC1848	Polypedilum scalaenum	O	O	Insecta	Diptera	Chironomidae	Chironomini	7	8	SH	SP
TC0404	Polypedilum simulans	O	O	Insecta	Diptera	Chironomidae	Chironomini	8	8	SH	SP
TC1849	Polypedilum trigonum	O	O	Insecta	Diptera	Chironomidae	Chironomini	7	8	SH	SP
TC1850	Polypedilum tritum	O	O	Insecta	Diptera	Chironomidae	Chironomini	7	8	SH	SP
TC2297	Porifera	O	X					0	.	CF	CB
TC2019	Potamanthidae	A	A	Insecta	Ephemeroptera	Potamanthidae		4	4	CG	CN
TC0221	Potamanthus	O	O	Insecta	Ephemeroptera	Potamanthidae		4	4	CG	CN
TC2242	Potamilus	O	X	Pelecypoda	Unionoida	Unionidae		4	.	CF	BU
TC2240	Potamilus alatus	O	X	Pelecypoda	Unionoida	Unionidae		4	.	CF	BU
TC2241	Potamilus purpuratus	O	X	Pelecypoda	Unionoida	Unionidae		4	.	CF	BU
TC1470	Potamothhrix	O	O	Oligochaeta	Haplotaxida	Tubificidae		8	.	CG	BU
TC1469	Potamothhrix bavaricus	B	B	Oligochaeta	Haplotaxida	Tubificidae		8	.	CG	BU
TC1471	Potamothrix vejdovskyi	B	B	Oligochaeta	Haplotaxida	Tubificidae		8	.	CG	BU
TC1801	Potamyia	B	B	Insecta	Trichoptera	Hydropsychidae		6	4	CF	CN
TC1800	Potamyia flava	O	O	Insecta	Trichoptera	Hydropsychidae		6	4	CF	CN
TC1851	Potthastia	O	O	Insecta	Diptera	Chironomidae	Diamesinae	0	6	CG	SP
TC1436	Pristina	O	O	Oligochaeta	Haplotaxida	Naididae		4	.	CG	CN
TC1427	Pristina aequiseta	B	B	Oligochaeta	Haplotaxida	Naididae		4	.	CG	CN
TC1428	Pristina breviseta	B	B	Oligochaeta	Haplotaxida	Naididae		4	.	CG	CN
TC1429	Pristina foreli	B	B	Oligochaeta	Haplotaxida	Naididae		4	.	CG	CN
TC1430	Pristina leidyi	B	B	Oligochaeta	Haplotaxida	Naididae		4	.	CG	CN
TC1431	Pristina longiseta	B	B	Oligochaeta	Haplotaxida	Naididae		4	.	CG	CN
TC1432	Pristina longiseta longiseta	B	B	Oligochaeta	Haplotaxida	Naididae		4	.	CG	CN
TC1433	Pristina longisoma	B	B	Oligochaeta	Haplotaxida	Naididae		8	.	CG	CN
TC1434	Pristina osborni	B	B	Oligochaeta	Haplotaxida	Naididae		4	.	CG	CN
TC1435	Pristina sima	B	B	Oligochaeta	Haplotaxida	Naididae		4	.	CG	CN

Table 3. continued

Taxacode	FinalID	Qaid	Qaid1	Class	Order	Family	Tribe	TolVal	FamTolVal	FFG	Habit
TC1437	Pristinella	O	O	Oligochaeta	Haplotaxida	Naididae		4	.	CG	CN
TC0419	Probezzia	B	B	Insecta	Diptera	Ceratopogonidae		4	6	PR	SP
TC1587	Probezzia pallida	B	B	Insecta	Diptera	Ceratopogonidae		6	6	PR	SP
TC0405	Procladius	O	O	Insecta	Diptera	Chironomidae	Tanypodinae	9	9	PR	SP
TC0406	Procloeon	O	O	Insecta	Ephemeroptera	Baetidae		2	4	SC	SP
TC1852	Prodiamesa	O	O	Insecta	Diptera	Chironomidae	Diamesinae	1	3	CG	CN
TC1706	Progomphus	O	O	Insecta	Odonata	Gomphidae		4	1	PR	BU
TC1705	Progomphus obscurus	B	B	Insecta	Odonata	Gomphidae		4	1	PR	BU
TC2207	Promenetus	O	X	Gastropoda	Pulmonata	Planorbidae		6	.	SC	SP
TC2208	Promenetus umbilicatellus	B	X	Gastropoda	Pulmonata	Planorbidae		6	.	SC	SP
TC0236	Promoresia	B	B	Insecta	Coleoptera	Elmidae		2	.	SC	CN
TC2246	Proptera	O	X	Pelecypoda	Unionoida	Unionidae		4	.	CF	BU
TC2243	Proptera alata	O	X	Pelecypoda	Unionoida	Unionidae		4	.	CF	BU
TC2244	Proptera laevissima	O	X	Pelecypoda	Unionoida	Unionidae		4	.	CF	BU
TC2245	Proptera purpurata	O	X	Pelecypoda	Unionoida	Unionidae		4	.	CF	BU
TC2282	Prostoma	O	O	Enopla	Holonemertea	Tetrastemmatidae		6	.	CG	SP
TC2280	Prostoma graecense	B	B	Enopla	Holonemertea	Tetrastemmatidae		6	.	CG	SP
TC2281	Prostoma rubrum	B	B	Enopla	Holonemertea	Tetrastemmatidae		6	.	CG	SP
TC0372	Protanypus	O	O	Insecta	Diptera	Chironomidae	Diamesinae	6	.	CG	BU
TC1774	Protoptila	O	O	Insecta	Trichoptera	Glossosomatidae		1	1	SC	CN
TC1853	Psectrocladius	O	O	Insecta	Diptera	Chironomidae	Orthocladiinae	2	8	CG	SP
TC1854	Psectrotanypus	O	O	Insecta	Diptera	Chironomidae	Tanypodinae	8	10	PR	SP
TC0238	Psephenidae	O	O	Insecta	Coleoptera	Psephenidae		4	4	SC	CN
TC0241	Psephenus	B	B	Insecta	Coleoptera	Psephenidae		4	4	SC	CN
TC1991	Pseudiron centralis	O	O	Insecta	Ephemeroptera	Heptageniidae		6	4	PR	SP
TC0407	Pseudochironomus	O	O	Insecta	Diptera	Chironomidae	Chironomini	6	5	PR	SP
TC1973	Pseudocloeon	O	O	Insecta	Ephemeroptera	Baetidae		4	4	CG	CN
TC1965	Pseudolimnophila	B	B	Insecta	Diptera	Tipulidae		4	2	SH	Burrower
TC1855	Pseudorthocladius	O	O	Insecta	Diptera	Chironomidae	Orthocladiinae	0	0	CG	SP

Table 3. continued

Taxacode	FinalID	Qaid	Qaid1	Class	Order	Family	Tribe	TolVal	FamTolVal	FFG	Habit
TC0134	Pseudosmittia	O	O	Insecta	Diptera	Chironomidae	Orthrocladinae	6	6	CG	SP
TC2129	Pseudostenophylax	O	O	Insecta	Trichoptera	Limnephilidae		1	4	SH	SP
TC2174	Pseudosuccinea	O	X	Gastropoda	Basommatophora	Lymnaeidae		7	.	SC	SP
TC2175	Pseudosuccinea columella	B	X	Gastropoda	Basommatophora	Lymnaeidae		7	.	SC	SP
TC1856	Psilometicnemus	O	O	Insecta	Diptera	Chironomidae	Orthocladiinae	2	6	CG	SP
TC1933	Psychoda	B	B	Insecta	Diptera	Psychodidae		9	10	CG	BU
TC1934	Psychodidae	O	O	Insecta	Diptera	Psychodidae		9	10	CG	BU
TC2150	Psychomyia	O	O	Insecta	Trichoptera	Psychomyiidae		1	2	SC	BU
TC2151	Psychomyiidae	O	O	Insecta	Trichoptera	Psychomyiidae		1	2	SC	BU
TC1763	Pteronarcyidae	A	A	Insecta	Plecoptera	Pteronarcidae		1	0	SH	SP
TC1762	Pteronarcys	O	O	Insecta	Plecoptera	Pteronarcidae		1	0	SH	SP
TC1759	Pteronarcys californica	B	B	Insecta	Plecoptera	Pteronarcidae		1	0	SH	SP
TC1760	Pteronarcys dorsata	B	B	Insecta	Plecoptera	Pteronarcidae		1	0	SH	SP
TC1761	Pteronarcys pictetti	B	B	Insecta	Plecoptera	Pteronarcidae		1	0	SH	SP
TC1566	Ptilodactylidae	O	O	Insecta	Coleoptera	Ptilodactylidae		6	.	PR	CB
TC2131	Ptilostomis	O	O	Insecta	Trichoptera	Limnephiloidae		3	5	SH	SP
TC1935	Ptychoptera	B	B	Insecta	Diptera	Ptychopteridae		7	.	CG	SP
TC1936	Ptychopteridae	O	O	Insecta	Diptera	Ptychopteridae		7	.	CG	SP
TC2132	Pycnopsyche	O	O	Insecta	Trichoptera	Limnephiloidae		3	4	SH	SP
TC2081	Pyralidae	O	X	Insecta	Lepidoptera	Pyralidae		4	5	SH	SP
TC1512	Pyrrhalta	B	B	Insecta	Coleoptera	Chrysomelidae		6	.	SH	SP
TC2252	Quadrula	O	X	Pelecypoda	Unionoida	Unionidae		4	.	CF	BU
TC2247	Quadrula cylindrica	O	X	Pelecypoda	Unionoida	Unionidae		0	.	CF	BU
TC2248	Quadrula metanerva	O	X	Pelecypoda	Unionoida	Unionidae		4	.	CF	BU
TC2249	Quadrula nodulata	O	X	Pelecypoda	Unionoida	Unionidae		4	.	CF	BU
TC2250	Quadrula pustulosa	O	X	Pelecypoda	Unionoida	Unionidae		4	.	CF	BU
TC2251	Quadrula quadrula	O	X	Pelecypoda	Unionoida	Unionidae		6	.	CF	BU
TC1473	Quistradrilus	O	O	Oligochaeta	Haplotaxida	Tubificidae		8	.	CG	BU
TC1472	Quistradrilus multisetosus	B	B	Oligochaeta	Haplotaxida	Tubificidae		8	.	CG	BU

Table 3. continued

Taxacode	FinalID	Qaid	Qaid1	Class	Order	Family	Tribe	TolVal	FamTolVal	FFG	Habit
TC3244	Radotanypus	O	O	Insecta	Diptera	Chironomidae	Tanypodinae	6	.	PR	SP
TC2060	Ranatra	B	X	Insecta	Hemiptera	Nepidae		6	.	PR	CN
TC2056	Ranatra australis	B	X	Insecta	Hemiptera	Nepidae		4	.	PR	CN
TC2057	Ranatra fusca	B	X	Insecta	Hemiptera	Nepidae		8	.	PR	CN
TC2058	Ranatra kirkaldyi	B	X	Insecta	Hemiptera	Nepidae		4	.	PR	CN
TC2059	Ranatra nigra	B	X	Insecta	Hemiptera	Nepidae		6	.	PR	CN
TC2076	Rhagovelia	B	X	Insecta	Hemiptera	Veliidae		10	.	PR	SK
TC2074	Rhagovelia obesa	B	X	Insecta	Hemiptera	Veliidae		10	.	PR	SK
TC2075	Rhagovelia rivale	B	X	Insecta	Hemiptera	Veliidae		10	.	PR	SK
TC3259	Rhantus	B	B	Insecta	Coleoptera	Dytiscidae		9	.	PR	SW
TC1857	Rheocricotopus	O	O	Insecta	Diptera	Chironomidae	Orthocladiinae	5	6	PR	SP
TC0408	Rheotanytarsus	O	O	Insecta	Diptera	Chironomidae	Tanytarsini	6	6	CF	CN
TC1858	Rheotanytarsus akrina	B	B	Insecta	Diptera	Chironomidae	Orthocladiinae	6	6	CF	CN
TC1859	Rheotanytarsus distinctissimus	B	B	Insecta	Diptera	Chironomidae	Tanytarsini	6	6	CF	CN
TC2041	Rheumatobates	B	X	Insecta	Hemiptera	Gerridae		6	.	PR	SK
TC2040	Rheumatobates rileyi	B	X	Insecta	Hemiptera	Gerridae		6	.	PR	SK
TC1992	Rhithrogena	O	O	Insecta	Ephemeroptera	Heptageniidae		2	0	CG	CN
TC2152	Rhyacophila	O	O	Insecta	Trichoptera	Rhyacophilidae		0	0	PR	CN
TC2153	Rhyacophilidae	A	A	Insecta	Trichoptera	Rhyacophilidae		0	0	PR	CN
TC1862	Robackia	O	O	Insecta	Diptera	Chironomidae	Chironomini	7	4	CG	BU
TC1860	Robackia claviger	B	B	Insecta	Diptera	Chironomidae	Chironomini	7	4	CG	BU
TC1861	Robackia demeijerei	B	B	Insecta	Diptera	Chironomidae	Chironomini	7	4	CG	BU
TC1863	Saetheria	O	O	Insecta	Diptera	Chironomidae	Chironomini	4	4	CG	BU
TC1864	Saetheria tylus	B	B	Insecta	Diptera	Chironomidae	Chironomini	4	4	CG	BU
TC2069	Salda	B	X	Insecta	Hemiptera	Saldidae		8	.	PR	CB
TC2071	Saldidae	O	X	Insecta	Hemiptera	Saldidae		8	.	PR	CB
TC2070	Saldula	B	X	Insecta	Hemiptera	Saldidae		8	.	PR	CB
TC1937	Sarcophagidae	O	O	Insecta	Diptera	Sarcophagidae		9	.	CG	SP
TC1939	Sciomyzidae	O	O	Insecta	Diptera	Sciomyzidae		6	.	PR	SP

Table 3. continued

Taxacode	FinalID	Qaid	Qaid1	Class	Order	Family	Tribe	TolVal	FamTolVal	FFG	Habit
TC3280	Scirtes	B	B	Insecta	Coleoptera	Scirtidae		6	.	SC	CN
TC1569	Scirtidae	O	O	Insecta	Coleoptera	Scirtidae		6	.	SC	CN
TC0218	Serratella	O	O	Insecta	Ephemeroptera	Ephemerellidae		2	2	PR	CN
TC2091	Sialidae	O	X	Insecta	Megaloptera	Sialidae		8	4	PR	CB
TC0432	Sialis	B	X	Insecta	Megaloptera	Sialidae		8	4	PR	BU
TC0409	Sigara	B	X	Insecta	Hemiptera	Corixidae		8	.	PR	SW
TC0140	Simuliidae	O	O	Insecta	Diptera	Simuliidae		6	6	CF	CN
TC0141	Simulium	B	B	Insecta	Diptera	Simuliidae		6	6	CF	CN
TC1943	Simulium decorum	B	B	Insecta	Diptera	Simuliidae		6	6	CF	CN
TC1941	Simulium jenningsi	B	B	Insecta	Diptera	Simuliidae		6	6	CF	CN
TC1944	Simulium luggeri	B	B	Insecta	Diptera	Simuliidae		6	6	CF	CN
TC1945	Simulium tuberosum	B	B	Insecta	Diptera	Simuliidae		6	6	CF	CN
TC0333	Simulium venustum	B	B	Insecta	Diptera	Simuliidae		5	5	CF	CN
TC1942	Simulium vittatum	B	B	Insecta	Diptera	Simuliidae		8	7	CF	CN
TC0215	Siphlonuridae	A	A	Insecta	Ephemeroptera	Siphlonuridae		3	7	CG	SW
TC0216	Siphlonurus	O	O	Insecta	Ephemeroptera	Siphlonuridae		7	7	CG	SW
TC0219	Siphloplecton	O	O	Insecta	Ephemeroptera	Metretopodidae		2	.	PR	SW
TC2095	Sisyra	B	X	Insecta	Neuroptera	Sisyridae		6	4	PR	CB
TC2096	Sisyra vicaria	B	X	Insecta	Neuroptera	Sisyridae		4	4	PR	CB
TC2097	Sisyridae	O	X	Insecta	Neuroptera	Sisyridae		6	4	PR	CB
TC1440	Slavina	O	O	Oligochaeta	Haplotaxida	Naididae		6	.	CG	CN
TC1438	Slavina appendiculata	B	B	Oligochaeta	Haplotaxida	Naididae		6	.	CG	CN
TC1439	Slavina fossularis	B	B	Oligochaeta	Haplotaxida	Naididae		6	.	CG	CN
TC1865	Smittia	O	O	Insecta	Diptera	Chironomidae	Orthocladiinae	4	6	CG	CN
TC1695	Somatochlora	O	O	Insecta	Odonata	Corduliidae		1	5	PR	CB
TC2180	Somatogyrus	O	X	Gastropoda	Mesogastropoda	Hydrobiidae		4	.	SC	SP
TC1441	Specaria	O	O	Oligochaeta	Haplotaxida	Naididae		6	.	CG	CN
TC1442	Specaria josinae	B	B	Oligochaeta	Haplotaxida	Naididae		6	.	CG	CN
TC0243	Sperchopsis	B	B	Insecta	Coleoptera	Hydrophilidae		5	.	PR	CN

Table 3. continued

Taxacode	FinalID	Qaid	Qaid1	Class	Order	Family	Tribe	TolVal	FamTolVal	FFG	Habit
TC1561	Sphaeridium	B	B	Insecta	Coleoptera	Hydrophilidae		8	.	CF	BU
TC2273	Sphaeriidae	A	X	Pelecypoda	Veneroida	Sphaeriidae		8	.	CF	BU
TC2271	Sphaerium	O	X	Pelecypoda	Veneroida	Sphaeriidae		8	.	CF	BU
TC2269	Sphaerium occidentale	B	X	Pelecypoda	Veneroida	Sphaeriidae		8	.	CF	BU
TC2270	Sphaerium simile	B	X	Pelecypoda	Veneroida	Sphaeriidae		8	.	CF	BU
TC2272	Sphaerium striatinum	B	X	Pelecypoda	Veneroida	Sphaeriidae		8	.	CF	BU
TC1588	Sphaeromias	B	B	Insecta	Diptera	Ceratopogonidae		6	6	PR	SP
TC1474	Spirosperma nikolskyi	O	O	Oligochaeta	Haplotaxida	Tubificidae		6	.	CG	BU
TC2293	Spongilla	B	X	Demospongia	Haplosclerina	Spongillidae		0	.	CF	CN
TC2294	Spongilla fragilis	B	X	Demospongia	Haplosclerina	Spongillidae		0	.	CF	CN
TC2295	Spongilla lacustris	B	X	Demospongia	Haplosclerina	Spongillidae		0	.	CF	CN
TC2296	Spongilliidae	O	X	Demospongia	Haplosclerina	Spongillidae		0	.	CF	CN
TC2176	Stagnicola	O	X	Gastropoda	Basommatophora	Lymnaeidae		8	.	SC	SP
TC1570	Staphylinidae	O	O	Insecta	Coleoptera	Staphylinidae		8	.	PR	CN
TC1866	Stelechomyia	O	O	Insecta	Diptera	Chironomidae	Chironomini	6	8	CG	BU
TC1867	Stelechomyia perpulchra	B	B	Insecta	Diptera	Chironomidae	Chironomini	6	8	CG	BU
TC1868	Stempellina	O	O	Insecta	Diptera	Chironomidae	Tanytarsini	2	6	CG	CB
TC1869	Stempellinella	O	O	Insecta	Diptera	Chironomidae	Tanytarsini	4	4	CG	CB
TC1994	Stenacron	A	A	Insecta	Ephemeroptera	Heptageniidae		7	7	SC	CN
TC1993	Stenacron interpunctatum	O	O	Insecta	Ephemeroptera	Heptageniidae		7	7	SC	CN
TC0142	Stenelmis	B	B	Insecta	Coleoptera	Elmidae		5	5	SC	CN
TC1537	Stenelmis humerosa	B	B	Insecta	Coleoptera	Elmidae		6	5	SC	CN
TC1538	Stenelmis sexlineata	B	B	Insecta	Coleoptera	Elmidae		6	5	SC	CN
TC1870	Stenochironomus	O	O	Insecta	Diptera	Chironomidae	Chironomini	4	5	SH	BU
TC0143	Stenonema	A	A	Insecta	Ephemeroptera	Heptageniidae		5	4	SC	CN
TC1995	Stenonema bipunctatum	O	O	Insecta	Ephemeroptera	Heptageniidae		3	4	SC	CN
TC1996	Stenonema exiguum	O	O	Insecta	Ephemeroptera	Heptageniidae		2	4	SC	CN
TC1997	Stenonema femoratum	O	O	Insecta	Ephemeroptera	Heptageniidae		3	5	SC	CN
TC1998	Stenonema integrum	O	O	Insecta	Ephemeroptera	Heptageniidae		4	4	SC	CN

Table 3. continued

Taxacode	FinalID	Qaid	Qaid1	Class	Order	Family	Tribe	TolVal	FamTolVal	FFG	Habit
TC1999	Stenonema mediopunctatum	O	O	Insecta	Ephemeroptera	Heptageniidae		2	3	SC	CN
TC3249	Stenonema mexicanum	O	O	Insecta	Ephemeroptera	Heptageniidae		3	4	SC	CN
TC2000	Stenonema mexicanum integrum	O	O	Insecta	Ephemeroptera	Heptageniidae		3	4	SC	CN
TC2001	Stenonema pulchellum	O	O	Insecta	Ephemeroptera	Heptageniidae		2	4	SC	CN
TC2002	Stenonema terminatum	O	O	Insecta	Ephemeroptera	Heptageniidae		3	4	SC	CN
TC2003	Stenonema tripunctatum	O	O	Insecta	Ephemeroptera	Heptageniidae		3	4	SC	CN
TC1871	Stictochironomus	O	O	Insecta	Diptera	Chironomidae	Chironomini	8	9	CG	BU
TC1872	Stictochironomus varius	B	B	Insecta	Diptera	Chironomidae	Chironomini	8	8	CG	BU
TC1589	Stilobezzia	B	B	Insecta	Diptera	Ceratopogonidae		6	6	PR	SP
TC1873	Stilocladius	O	O	Insecta	Diptera	Chironomidae	Chironomini	1	6	CG	SP
TC1952	Stratiomyidae	O	O	Insecta	Diptera	Stratiomyidae		8	.	SH	BU
TC1951	Stratiomys	B	B	Insecta	Diptera	Stratiomyidae		8	.	SH	SP
TC1445	Stylaria	O	O	Oligochaeta	Haplotaxida	Naididae		8	.	CG	CN
TC1443	Stylaria fossularis	B	B	Oligochaeta	Haplotaxida	Naididae		8	.	CG	CN
TC1444	Stylaria lacustris	B	B	Oligochaeta	Haplotaxida	Naididae		8	.	CG	CN
TC1707	Stylogomphus	O	O	Insecta	Odonata	Gomphidae		6	1	CG	BU
TC1708	Stylurus	O	O	Insecta	Odonata	Gomphidae		6	.	CG	BU
TC1874	Sublettea	O	O	Insecta	Diptera	Chironomidae	Tanytarsini	2	6	CF	CB
TC1564	Suphisellus	B	B	Insecta	Coleoptera	Noteridae		5	.	PR	CB
TC1724	Sympetrum	O	O	Insecta	Odonata	Libellulidae		9	10	PR	SP
TC1803	Symphitopsyche	B	B	Insecta	Trichoptera	Hydropsychidae		4	4	CG	CN
TC1802	Symphitopsyche piatrix	O	O	Insecta	Trichoptera	Hydropsychidae		2	4	CF	CN
TC1875	Symposiocladius	O	O	Insecta	Diptera	Chironomidae	Orthocladiinae	4	.	UN	CN
TC1876	Sympotthastia	O	O	Insecta	Diptera	Chironomidae	Diamesinae	2	2	CG	SP
TC1877	Synorthocladius	O	O	Insecta	Diptera	Chironomidae	Orthocladiinae	2	2	CG	SP
TC1954	Syrphidae	O	O	Insecta	Diptera	Syrphidae		10	10	SH	BU
TC0144	Tabanidae	O	O	Insecta	Diptera	Tabanidae		8	5	PR	SP
TC1956	Tabanus	B	B	Insecta	Diptera	Tabanidae		8	5	SH	BU
TC1766	Taeniopterygidae	A	A	Insecta	Plecoptera	Taeniopterygidae		2	2	SH	CN

Table 3. continued

Taxacode	FinalID	Qaid	Qaid1	Class	Order	Family	Tribe	TolVal	FamTolVal	FFG	Habit
TC1765	Taeniopteryx	O	O	Insecta	Plecoptera	Taeniopterygidae		2	2	SH	CN
TC1764	Taeniopteryx burski	B	B	Insecta	Plecoptera	Taeniopterygidae		2	2	SH	CN
TC1491	Talitridae	A	A	Crustacea	Amphipoda	Talitridae		1	.	CG	SW
TC0147	Tanypodinae	A	A	Insecta	Diptera	Chironomidae	Tanypodinae	7	8	PR	BU
TC1878	Tanypodini	A	A	Insecta	Diptera	Chironomidae	Tanypodinae	5	8	PR	SP
TC1730	Tanypteryx	O	O	Insecta	Odonata	Petaluridae		8	.	PR	CB
TC0433	Tanypus	O	O	Insecta	Diptera	Chironomidae	Tanypodinae	9	10	PR	SP
TC1879	Tanypus clavatus	B	B	Insecta	Diptera	Chironomidae	Tanypodinae	9	6	PR	SP
TC1880	Tanypus punctipennis	B	B	Insecta	Diptera	Chironomidae	Tanypodinae	9	6	PR	SP
TC1881	Tanypus stellatus	B	B	Insecta	Diptera	Chironomidae	Tanypodinae	9	6	PR	SP
TC1882	Tanytarsini	A	A	Insecta	Diptera	Chironomidae	Tanytarsini	5	8	CG	SP
TC0410	Tanytarsus	O	O	Insecta	Diptera	Chironomidae	Tanytarsini	6	6	CF	CB
TC2120	Telebasis	O	O	Insecta	Odonata	Coenagrionidae		8	9	PR	CB
TC1884	Telopelopia	O	O	Insecta	Diptera	Chironomidae	Tanypodinae	4	6	PR	SP
TC1883	Telopelopia okoboji	B	B	Insecta	Diptera	Chironomidae	Tanypodinae	4	6	PR	SP
TC2283	Tetrastemmatidae	A	A	Enopla	Holonemertea	Tetrastemmatidae		6	.	CG	SP
TC1533	Thermonectes	B	B	Insecta	Coleoptera	Dytiscidae		5	.	PR	SW
TC1885	Thienemannia	O	O	Insecta	Diptera	Chironomidae	Orthocladiinae	6	6	CG	SP
TC1886	Thienemanniella	O	O	Insecta	Diptera	Chironomidae	Orthocladiinae	6	6	PR	SP
TC1887	Thienemannimyia	O	O	Insecta	Diptera	Chironomidae	Tanypodinae	6	6	PR	SP
TC0148	Timpanoga	O	O	Insecta	Ephemeroptera	Ephemerellidae		7	.	CG	CN
TC0149	Tipula	B	B	Insecta	Diptera	Tipulidae		4	4	SH	BU
TC0334	Tipula abdominalis	B	B	Insecta	Diptera	Tipulidae		4	4	SH	BU
TC0375	Tipula strepens	B	B	Insecta	Diptera	Tipulidae		3	4	SH	BU
TC0150	Tipulidae	O	O	Insecta	Diptera	Tipulidae		3	4	SH	BU
TC2017	Tortopus	O	O	Insecta	Ephemeroptera	Polymitarcyidae		2	2	CG	CN
TC2253	Toxolasma parva	O	X	Pelecypoda	Unionoida	Unionidae		6	.	CF	BU
TC1918	Toxorhynchites	O	O	Insecta	Diptera	Culicidae		8	.	CF	SW
TC0411	Trepobates	B	X	Insecta	Hemiptera	Gerridae		10	.	PR	CB

Table 3. continued

Taxacode	FinalID	Qaid	Qaid1	Class	Order	Family	Tribe	TolVal	FamTolVal	FFG	Habit
TC1830	Triaenodes	O	O	Insecta	Trichoptera	Leptoceridae		6	6	SH	SP
TC1829	Triaenodes injustus	B	B	Insecta	Trichoptera	Leptoceridae		6	6	SH	SP
TC1831	Triaenodes tardus	B	B	Insecta	Trichoptera	Leptoceridae		6	6	SH	SP
TC1888	Tribelos	O	O	Insecta	Diptera	Chironomidae	Chironomini	5	5	CG	SP
TC2030	Trichocorixa	B	X	Insecta	Hemiptera	Corixidae		10	.	PR	SW
TC2154	Trichoptera	A	A	Insecta	Trichoptera				.		
TC1889	Trichotanypus	O	O	Insecta	Diptera	Chironomidae	Podonominae	2	6	CG	SP
TC2023	Tricorythidae	A	A	Insecta	Ephemeroptera	Tricorythidae		8	4	CG	CN
TC0420	Tricorythodes	O	O	Insecta	Ephemeroptera	Tricorythidae		4	4	CG	SP
TC1733	Tridactylidae	O	X	Insecta	Orthoptera	Tridactylidae		6	.	SH	BU
TC1508	Triops longicaudatus	O	X	Crustacea	Notostraca	Triopidae		6	.	SC	CN
TC3260	Trissopelopia	O	O	Insecta	Diptera	Chironomidae	Tanypodinae	6	.	PR	BU
TC0152	Tropisternus	B	B	Insecta	Coleoptera	Hydrophilidae		5	.	PR	CB
TC2255	Truncilla	O	X	Pelecypoda	Unionoida	Unionidae		4	.	CF	BU
TC2254	Truncilla donaciformis	O	X	Pelecypoda	Unionoida	Unionidae		4	.	CF	BU
TC2256	Truncilla truncata	O	X	Pelecypoda	Unionoida	Unionidae		4	.	CF	BU
TC0184	Tubifex	O	O	Oligochaeta	Haplotaxida	Tubificidae		10	.	CG	BU
TC1475	Tubifex superiorensis	B	B	Oligochaeta	Haplotaxida	Tubificidae		9	.	CG	BU
TC0153	Tubifex tubifex	B	B	Oligochaeta	Haplotaxida	Tubificidae		10	.	CG	BU
TC0154	Tubificidae	A	A	Oligochaeta	Haplotaxida	Tubificidae		9	.	CG	BU
TC2292	Turbellaria	A	A	Turbellaria				5	.	UN	SP
TC1891	Tvetenia	O	O	Insecta	Diptera	Chironomidae	Orthocladiinae	5	5	CG	SP
TC1890	Tvetenia bavarica	B	B	Insecta	Diptera	Chironomidae	Orthocladiinae	5	5	CG	SP
TC3265	Tvetenia vitracies	B	B	Insecta	Diptera	Chironomidae	Orthrocladinae	5	5	CG	SP
TC1446	Uncinais	O	O	Oligochaeta	Haplotaxida	Naididae		8	.	CG	CN
TC1447	Uncinais uncinata	B	B	Oligochaeta	Haplotaxida	Naididae		8	.	CG	CN
TC2257	Unionidae	A	X	Pelecypoda	Unionoida	Unionidae		5	.	CF	BU
TC2161	Urnatella gracilis	O	X	Entoprocta				2	.	CF	CN
TC3262	Uvarus	B	B	Insecta	Coleoptera	Dytiscidae		8	.	PR	SW

Table 3. continued

Taxacode	FinalID	Qaid	Qaid1	Class	Order	Family	Tribe	TolVal	FamTolVal	FFG	Habit
TC2186	Valvata	O	X	Gastropoda	Prosobranchia	Valvatidae		3	.	SC	SP
TC2187	Valvata tricarinata	B	X	Gastropoda	Prosobranchia	Valvatidae		3	.	SC	SP
TC2188	Valvatidae	A	X	Gastropoda	Prosobranchia	Valvatidae		3	.	SC	SP
TC1448	Vejdovskyella	O	O	Oligochaeta	Haplotaxida	Naididae		6	.	SC	CN
TC1449	Vejdovskyella intermedia	B	B	Oligochaeta	Haplotaxida	Naididae		6	.	CG	CN
TC2077	Veliidae	O	O	Insecta	Hemiptera	Veliidae		10	.	PR	SK
TC2190	Viviparidae	A	X	Gastropoda	Prosobranchia	Viviparidae		0	.	SC	SP
TC2182	Viviparus	O	X	Gastropoda	Mesogastropoda	Lymnaeidae		0	.	SC	SP
TC1450	Wapsa mobilis	O	O	Oligochaeta	Haplotaxida	Naididae		8	.	CG	CN
TC1696	Williamsonia	O	O	Insecta	Odonata	Corduliidae		1	5	PR	CB
TC2140	Wormaldia	O	O	Insecta	Trichoptera	Philopotamidae		2	3	CF	CN
TC1892	Xenochironomus	O	O	Insecta	Diptera	Chironomidae	Chironomini	1	8	PR	BU
TC1741	Zapada	O	O	Insecta	Plecoptera	Nemouridae		1	.	SH	SP
TC1742	Zapada cinctipes	B	B	Insecta	Plecoptera	Nemouridae		1	.	SH	SP
TC1893	Zavrelia	O	O	Insecta	Diptera	Chironomidae	Tanytarsini	6	6	CG	BU
TC1894	Zavreliella	O	O	Insecta	Diptera	Chironomidae	Chironomini	6	6	CG	BU
TC1895	Zavreliella marmorata	B	B	Insecta	Diptera	Chironomidae	Chironomini	6	6	CG	BU
TC1896	Zavrelimyia	O	O	Insecta	Diptera	Chironomidae	Tanypodinae	8	8	PR	SP
TC1736	Zealeuctra claasseni	O	O	Insecta	Plecoptera	Leuctridae		6	0	PR	CN

(a) Quid, Quid1
A – Above the recommended level of identification (should be classified lower if possible)
B – Below the recommended level of identification (beyond the level of classification necessary)
O – Recommended level of identification
X – Leave out of taxa list, for this level of analysis

(b) FFG – Functional Feeding Groups
FC – Filter/collector
GC – Gatherer/collector
OM – Omnivore
PA – Parasite

Table 3. continued

PI – Piercer
PR – Predator
SC – Scraper
SH –Shredder

(c) Habitat/Behavior Designations
BU – Burrower
CB – Climber
CN – Clinger
DV – Diver
SK – Skater
SP - Sprawler

Table 4. Fish species, taxonomy, tolerance values, and trophic levels collected in Nebraska, 1997-2001 R-EMAP.

CODE	COMMON NAME	SCIENTIFICNAME	Family	Common Family Name	Trophic	Tolerance	Introduced
9058	BIGMOUTH BUFFALO	ICTIOBUS CYPRINELLUS	Catostomidae	Sucker	I[(a)]	M[(b)]	
9042	BIGMOUTH SHINER	NOTROPIS DORSALIS	Cyprinidae	Minnow	I	M	
9071	BLACK BULLHEAD	AMEIURS MELAS	Ictaluridae	Catfish	I	M	
9102	BLACK CRAPPIE	POMOXIS NIGROMACULATUS	Centrarchidae	Sunfish	P	M	I
9097	BLUEGILL	LEPOMIS MACROCHIRUS	Centrarchidae	Sunfish	I	M	I
9048	BRASSY MINNOW	HYBOGNATHUS HANKINSONI	Cyprinidae	Minnow	O	M	
9064	BROOK SILVERSIDE	LABIDESTHES SICCULUS	Atherinidae	Silversides	I	M	I
9110	BROOK STICKLEBACK	CULAEA INCONSTANS	Gasterosteidae	Sticklebacks	I	M	
9032	BROWN TROUT	SALMO TRUTTA	Salmonidae	Trout	P	M	I
9055	CENTRAL STONEROLLER	CAMPOSTOMA ANOMALUM	Cyprinidae	Minnow	H	M	
9072	CHANNEL CATFISH	ICTALURUS PUNCTATUS	Ictaluridae	Catfish	P	M	
9015	COMMON CARP	CYPRINUS CARPIO	Cyprinidae	Minnow	O	T	I
9018	CREEK CHUB	SEMOTILUS ATROMACULATUS	Cyprinidae	Minnow	G	T	
9051	FATHEAD MINNOW	PIMEPHALES PROMELAS	Cyprinidae	Minnow	O	T	
9074	FLATHEAD CATFISH	PYLODICTIS OLIVARIS	Ictaluridae	Catfish	P	M	
9022	FLATHEAD CHUB	PLATYGOBIO GRACILIS	Cyprinidae	Minnow	I	M	
9123	FRESHWATER DRUM	APLODINOTUS GRUNNIENS	Sciaenidae	Drum	V	M	
9011	GIZZARD SHAD	DOROSOMA CEPEDIANUM	Clupeidae	Herring	O	M	I
9016	GOLDFISH	CARASSIUS AURATUS	Cyprinidae	Minnow	O	T	
9095	GREEN SUNFISH	LEPOMIS CYANELLUS	Centrarchidae	Sunfish	I	T	
9112	IOWA DARTER	ETHEOSTOMA EXILE	Percidae	Perch	I	M	
9063	LARGEMOUTH BASS	MICROPTERUS SALMOIDES	Centrarchidae	Sunfish	P	M	I
9106	LONGNOSE DACE	RHINICHTHYS CATARACTAE	Cyprinidae	Minnow	I	I	
9007	LONGNOSE GAR	LEPISOSTEUS OSSEUS	Lepisosteidae	Gar	P	M	
9087	LONGNOSE SUCKER	CATOSTOMUS CATOSTOMUS	Catostomidae	Sucker	I	M	
9086	MOSQUITOFISH	GAMBUSIA AFFINIS	Poeciliidae	Livebearers	I	M	I
9098	ORANGESPOTTED SUNFISH	LEPOMIS HUMILIS	Centrarchidae	Sunfish	I	M	
9119	ORANGETHROAT DARTER	ETHEOSTOMA SPECTABILE	Percidae	Perch	I	M	

Table 4. continued

CODE	COMMON NAME	SCIENTIFICNAME	Family	Common Family Name	Trophic	Tolerance	Introduced
9085	PLAINS KILLIFISH	FUNDULUS ZEBRINUS	Fundulidae	Topminnow Killifish			
9049	PLAINS MINNOW	HYBOGNATHUS PLACITUS	Cyprinidae	Minnow	O	M	
9083	PLAINS TOPMINNOW	FUNDULUS SCIADICUS	Fundulidae	Topminnow, Killifish			
9061	QUILLBACK	CARPIODES CYPRINUS	Catostomidae	Sucker	O	M	
9013	RAINBOW TROUT	ONCORHYNCHUS MYKISS	Salmonidae	Trout	P	M	I
9040	RED SHINER	NOTROPIS LUTRENSIS	Cyprinidae	Minnow	O	T	
9062	RIVER CARPSUCKER	CARPIODES CARPIO	Catostomidae	Sucker	O	M	
9036	RIVER SHINER	NOTROPIS BLENNIUS	Cyprinidae	Minnow	I	M	
9043	SAND SHINER	NOTROPIS STRAMINEUS	Cyprinidae	Minnow	I	M	
9026	SHOAL CHUB	HYBOPSIS AESTIVALIS	Cyprinidae	Minnow	I	I	
9067	SHORTHEAD REDHORSE	MOXOSTOMA MACROLEPIDOTUM	Catostomidae	Sucker	I	M	
9024	SILVER CHUB	MACRHYBOPSIS STORERIANA	Cyprinidae	Minnow	I	M	
9091	SMALLMOUTH BASS	MICROPTERUS DOLOMIEUI	Centrarchidae	Sunfish	P	M	I
9078	STONECAT	NOTURUS FLAVUS	Ictaluridae	Catfish	I	I	
9028	SUCKERMOUTH MINNOW	PHENACOBIUS MIRABILIS	Cyprinidae	Minnow	I	M	
9075	TADPOLE MADTOM	NOTURUS GYRINUS	Ictaluridae	Catfish	I	M	
9103	WALLEYE	STIZOSTEDION VITREUM	Percidae	Perch	P	M	I
9050	WESTERN SILVERY MINNOW	HYBOGNATHUS ARGYRITIS	Cyprinidae	Minnow			
9090	WHITE BASS	MORONE CHRYSOPS	Moronidae	Temperate Bass	P	M	I
9101	WHITE CRAPPIE	POMOXIS ANNULARIS	Centrarchidae	Sunfish	P	M	I
9069	WHITE SUCKER	CATOSTOMUS COMMERSONI	Catostomidae	Sucker	O	T	
9165	YELLOW BULLHEAD	AMEIURS NATALIS	Ictaluridae	Catfish	I	T	
9105	YELLOW PERCH	PERCA FLAVESCENS	Percidae	Perch	I	M	I

(a) Trophic Designations: F – Filter feeder; G - Generalist feeder; H – Herbivore; I – Insectivore; O – Omnivore; P – Piscivore; V – Insectivore

(b) Tolerance Designations: I – Intolerant; M – Intermediate; T - Tolerant

Table 5. Fish families, fish taxa, and fish numbers collected during 1997-2001 Nebraska R-EMAP.

Family	Common Family Name	Common Name	Scientific Name	Number Collected	Percent
Lepisosteidae	Gar	Longnose gar	Lepisosteus osseus	4	0.01
Clupeidae	Herring	Gizzard shad	Dorosoma cepedianum	675	1.28
Salmonidae	Trout	Brown trout	Salmo trutta	291	0.55
Salmonidae	Trout	Rainbow trout	Oncorhynchus mykiss	96	0.18
Cyprinidae	Minnow	Bigmouth shiner	Notropis dorsalis	10226	19.36
Cyprinidae	Minnow	Brassy minnow	Hybognathus hankinsoni	1835	3.47
Cyprinidae	Minnow	Central stoneroller	Campostoma anomalum	558	1.06
Cyprinidae	Minnow	Common carp	Cyprinus carpio	2072	3.92
Cyprinidae	Minnow	Creek chub	Semotilus atromaculatus	3446	6.52
Cyprinidae	Minnow	Fathead minnow	Pimephales promelas	3283	6.21
Cyprinidae	Minnow	Flathead chub	Platygobio gracilis	30	0.06
Cyprinidae	Minnow	Goldfish	Carassius auratus	1	0.00
Cyprinidae	Minnow	Longnose dace	Rhinichthys cataractae	150	0.28
Cyprinidae	Minnow	Plains minnow	Hybognathus placitus	60	0.11
Cyprinidae	Minnow	Red shiner	Notropis lutrensis	5387	10.20
Cyprinidae	Minnow	River carpsucker	Carpiodes carpio	301	0.57
Cyprinidae	Minnow	River shiner	Notropis blennius	344	0.65
Cyprinidae	Minnow	Sand shiner	Notropis stramineus	11902	22.53
Cyprinidae	Minnow	Shoal or speckled chub	Hybopsis aestivalis	24	0.05
Cyprinidae	Minnow	Silver chub	Macrhybopsis storeriana	6	0.01
Cyprinidae	Minnow	Suckermouth minnow	Phenacobius mirabilis	51	0.10
Cyprinidae	Minnow	Western silvery minnow	Hybognathus argyritis	176	0.33
Catostomidae	Sucker	Bigmouth buffalo	Ictiobus cyprinellus	44	0.08
Catostomidae	Sucker	Longnose sucker	Catostomus catostomus	284	0.54
Catostomidae	Sucker	Quillback	Carpiodes cyprinus	399	0.76
Catostomidae	Sucker	Shorthead redhorse	Moxostoma macrolepidotum	480	0.91
Catostomidae	Sucker	Smallmouth buffalo	Ictiobus bubalus	1	0.00

Table 5 continued

Family	Common Family Name	Common Name	Scientific Name	Number Collected	Percent
Catostomidae	Sucker	White sucker	Catostomus commersoni	1362	2.58
Ictaluridae	Catfish	Black bullhead	Ameiurs melas	12	0.02
Ictaluridae	Catfish	Channel catfish	Ictalurus punctatus	847	1.60
Ictaluridae	Catfish	Flathead catfish	Pylodictis olivaris	1	0.00
Ictaluridae	Catfish	Stonecat	Noturus flavus	234	0.44
Ictaluridae	Catfish	Tadpole madtom	Noturus gyrinus	1	0.00
Ictaluridae	Catfish	Yellow bullhead	Ameiurs natalis	3	0.01
Fundulidae	Topminnow, Killifish	Plains killifish	Fundulus zebrinus	5736	10.86
Fundulidae	Topminnow, Killifish	Plains topminnow	Fundulus sciadicus	129	0.24
Poeciliidae	Livebearers	Mosquitofish	Gambusia affinis	155	0.29
Atherinidae	Silversides	Brook silverside	Labidesthes sicculus	30	0.06
Gasterosteidae	Sticklebacks	Brook stickleback	Culaea inconstans	552	1.04
Moronidae	Temperate Bass	White bass	Morone chrysops	6	0.01
Centrarchidae	Sunfish	Black crappie	Pomoxis nigromaculatus	18	0.03
Centrarchidae	Sunfish	Bluegill	Lepomis macrochirus	264	0.50
Centrarchidae	Sunfish	Green sunfish	Lepomis cyanellus	92	0.17
Centrarchidae	Sunfish	Largemouth bass	Micropterus salmoides	173	0.33
Centrarchidae	Sunfish	Orangespotted sunfish	Lepomis humilis	4	0.01
Centrarchidae	Sunfish	Smallmouth bass	Micropterus dolomieui	18	0.03
Centrarchidae	Sunfish	White crappie	Pomoxis annularis	1	0.00
Percidae	Perch	Iowa darter	Etheostoma exile	22	0.04
Percidae	Perch	Orangethroat darter	Etheostoma spectabile	1032	1.95
Percidae	Perch	Walleye	Stizostedion vitreum	3	0.01
Percidae	Perch	Yellow perch	Perca flavescens	4	0.01
Sciaenidae	Drum	Freshwater drum	Aplodinotus grunniens	4	0.01
			Total	52829	

Table 6. Table of reference and perennial sites by ecoregion, stream size, and water temperature. Reference sites are marked with an asterisk (*). Reference sites were selected by having a Habitat HBI score of >38, a Fish IBI Score of >48, a Macroinvertebrate ICI score of >14, and a Threshold value of true. The number of reference sites for each ecoregional group, stream size, and water temperature grouping was determined from a bionominal table.

Ecoplace	Strmsize	Coldwarm	STORET	NDEQ_ID	Streamname	Habscore5	FishIBI8	BugSc	Thresh1	Reference/Comment
East 47 271	large	Warm	009556	MT1041	TEKAMAHA CREEK (B)	26	55.31670896	22	True	Periennial site
East 47 271	large	Warm	009583	LP1154	FOUR MILE CREEK	26	39.30921474	14	Fals	Periennial site
East 47 271	large	Warm	010204	MT2142	AOWA CREEK	26	45.80157588	10	Fals	Periennial site
East 47 271	large	Warm	009574	LP2159	WAHOO CREEK	28	32.62026354	4	Fals	Periennial site
East 47 271	large	Warm	009906	LB1081	LITTLE BLUE RIVER (A)	28	41.39256679	20	True	Periennial site
East 47 271	large	Warm	010109	NE2190	N. FORK BIG NEMAHA RIVER	28	51.69143576	22	True	Periennial site
East 47 271	large	Warm	010202	MT2140	EAST BOW CREEK	28	47.8796476	8	True	Periennial site
East 47 271	large	Warm	009579	EL4107	ELKHORN RIVER (A)	30	43.60046238	16	True	Periennial site
East 47 271	large	Warm	010089	LP2062	SALT CREEK	30	43.60076253	6	Fals	Periennial site
East 47 271	large	Warm	010091	LP2162	SAND CREEK	30	41.45727619	12	True	Periennial site
East 47 271	large	Warm	010092	LP2163	OAK CREEK	32	69.05465904	14	Fals	Periennial site
East 47 271	large	Warm	010106	NE2187	LONG BRANCH	32	32.60217806	26	True	Periennial site
East 47 271	large	Warm	010185	EL2100	LOGAN CREEK	32	34.76651662	20	Fals	Periennial site
East 47 271	large	Warm	009704	EL1095	FREMONT STORM DRAINAGE CANAL	34	66.19834343	14	Fals	Periennial site
East 47 271	large	Warm	009704	EL1095	FREMONT STORM DRAINAGE CANAL	34	66.19834343	14	Fals	Periennial site
East 47 271	large	Warm	010190	EL3106	NORTH FORK ELKHORN RIVER	34	32.90990265	18	True	Periennial site
East 47 271	large	Warm	010095	LP2166	MIDDLE CREEK	36	59.81026127	18	True	Periennial site
East 47 271	large	Warm	010183	EL1098	MAPLE CREEK	36	29.92885939	8	True	Periennial site
East 47 271	large	Warm	010184	EL1099	ELKHORN RIVER (E)	36	46.21286393	8	True	Periennial site
East 47 271	large	Warm	010203	MT1136	TEKAMAH CREEK (A)	36	67.92410086	22	Fals	Periennial site
East 47 271	large	Warm	010192	EL4111	ELKHORN RIVER (D)	*38	52.08031936	14	True	Reference
East 47 271	large	Warm	010201	MT1137	OMAHA CREEK	*38	61.24761408	22	True	Reference
East 47 271	large	Warm	010206	MT2144	BOW CREEK (B)	*38	48.04848611	20	Fals	NPDES
East 47 271	large	Warm	010207	MT2145	BOW CREEK (A)	*40	44.55348627		True	Reference
East 47 271	large	Warm	009905	LB2080	LITTLE BLUE RIVER (B)	*48	46.91030605	22	True	Reference

Table 6. continued

Ecoplace	Strmsize	Coldwarm	STORET	NDEQ_ID	StreamnameE	Habscore5	FishIBI8	BugSc	Thresh1	Reference/Comment
East 47 271	mediu	Cold	009727	MT2139	HOWE CREEK	*52	66.87973204	22	True	Reference
East 47 271	mediu	Warm	010208	MT2146	JORDON CREEK	22	34.80684746	16	True	Periennial site
East 47 271	mediu	Warm	010208	MT2146	JORDON CREEK	22	34.80684746	16	True	Periennial site
East 47 271	mediu	Warm	010108	NE2189	N. FORK BIG NEMAHA RIVER	24	59.79665286	20	True	Periennial site
East 47 271	mediu	Warm	009706	LP1155	UNNAMED TRIB. MIDDLE CREEK	26	53.19230824	26	True	Periennial site
East 47 271	mediu	Warm	010096	LP2167	MILLER BRANCH	26	71.68137255	18	True	Periennial site
East 47 271	mediu	Warm	010113	NE3194	SPRING CREEK	26	41.44035891	18	True	Periennial site
East 47 271	mediu	Warm	009557	MT1131	PIGEON CREEK (A)	28	80.12636142	16	Fals	Periennial site
East 47 271	mediu	Warm	009706	LP1155	UNNAMED TRIB. MIDDLE CREEK	28	53.19230824	26	True	Periennial site
East 47 271	mediu	Warm	009902	BB4125	PLUM CREEK	28	43.82034772	24	True	Periennial site
East 47 271	mediu	Warm	010103	NE1182	SOUTH CEDAR CREEK	28	53.27627856	24	True	Periennial site
East 47 271	mediu	Warm	010110	NE2191	BALLS BRANCH	28	46.48218349	24	True	Periennial site
East 47 271	mediu	Warm	010187	EL2103	BAKER CREEK	28	58.96581157	26	True	Periennial site
East 47 271	mediu	Warm	010198	MT1134	PIGEON CREEK (B)	28	59.69752777	24	True	Periennial site
East 47 271	mediu	Warm	009561	LP2158	COTTONWOOD CREEK	30	50.83861462	18	True	Periennial site
East 47 271	mediu	Warm	009570	EL1093	TRACY CREEK	30	39.54718281	14	Fals	Periennial site
East 47 271	mediu	Warm	009718	MT1130	UNNAMED TRIB. BLACKBIRD CREEK (B)	30	51.12121434	24	True	Periennial site
East 47 271	mediu	Warm	010098	LP2169	HICKMAN BRANCH	30	46.80610744	18	True	Periennial site
East 47 271	mediu	Warm	010100	NE1179	HONEY CREEK	30	59.63445413	20	True	Periennial site
East 47 271	mediu	Warm	010107	NE2188	YANKEE CREEK	30	41.97261656	16	True	Periennial site
East 47 271	mediu	Warm	009903	BB1130	MUD CREEK	32	49.20815806	12	True	Periennial site
East 47 271	mediu	Warm	010090	LP2088	MIDDLE CREEK	32	51.81735516	26	True	Periennial site
East 47 271	mediu	Warm	010094	LP2165	DUCK CREEK	32	42.2605013	10	Fals	Periennial site
East 47 271	mediu	Warm	010188	EL2104	DOG CREEK	32	34.27340144	24	True	Periennial site
East 47 271	mediu	Warm	010209	MT2147	UNNAMED TRIB. BAZILE CREEK	32	90.80882353	28	True	Periennial site
East 47 271	mediu	Warm	009746	LP1157	DECKER CREEK	34	48.12501108	18	True	Periennial site
East 47 271	mediu	Warm	010090	LP2088	MIDDLE CREEK	34	51.81735516	26	True	Periennial site
East 47 271	mediu	Warm	010102	NE1181	N. BRANCH WEEPING WATER CREEK	34	51.81905296	26	True	Periennial site
East 47 271	mediu	Warm	009552	LP2161	UNNAMED TRIB. LITTLE SALT CREEK	36	56.77773036	10	True	Periennial site

Table 6. continued

Ecoplace	Strmsize	Coldwarm	STORET	NDEQ_ID	StreamnameE	Habscore5	FishIBI8	BugSc	Thresh1	Reference/Comment
East 47 271	mediu	Warm	009560	LP1153	PAWNEE CREEK	36	45.7054081	24	True	Periennial site
East 47 271	mediu	Warm	009569	EL1094	UNION CREEK	36	44.26049515	12	Fals	Periennial site
East 47 271	mediu	Warm	009718	MT1130	UNNAMED TRIB. BLACKBIRD CREEK (B)	36	51.12121434	24	True	Periennial site
East 47 271	mediu	Warm	009909	LB2110	DRY SANDY CREEK	36	51.00155198	20	True	Periennial site
East 47 271	mediu	Warm	010087	LP1023	PAWNEE CREEK	36	44.32336817	18	True	Periennial site
East 47 271	mediu	Warm	010101	NE1180	COTTIER CREEK	36	82.26473316	22	True	Periennial site
East 47 271	mediu	Warm	010195	MT1050	UNNAMED TRIB. BLACKBIRD CREEK (A)	36	60.45520369	18	True	Periennial site
East 47 271	mediu	Warm	009585	NE2183	RATTLESNAKE CREEK	*38	43.06237405	26	True	Reference
East 47 271	mediu	Warm	009705	NE1178	DUCK CREEK	*38	50.27448112	22	Fals	Channelized
East 47 271	mediu	Warm	010103	NE1182	SOUTH CEDAR CREEK	*38	53.27627856	24	True	Reference
East 47 271	mediu	Warm	010191	EL4108	BATTLE CREEK	*38	60.99166687	28	True	Reference
East 47 271	mediu	Warm	010195	MT1050	UNNAMED TRIB. BLACKBIRD CREEK (A)	*38	60.45520369	18	True	Reference
East 47 271	mediu	Warm	010112	NE3193	INDIAN CREEK	*40	60.18250182	18	True	Reference
East 47 271	mediu	Warm	010104	NE2184	PONY CREEK	*42	46.79036904	24	True	Reference
East 47 271	mediu	Warm	009904	BB1003	SPRING CREEK (BB)	*44	68.2857129	22	True	Reference
East 47 271	mediu	Warm	010205	MT2143	UNNAMED TRIB. NORWEGIAN BOW CREEK	*44	61.06392719	22	True	Reference
East 47 271	mediu	Warm	010200	MT2141	BEAVER CREEK	*48	66.47017615	24	True	Reference
East 47 271	small	Warm	010197	MT1133	UNNAMED TRIB. BIG PAPILLION CREEK	22	73.50446224	4	True	Periennial site
East 47 271	small	Warm	009813	BB1115	BEAR CREEK	24	56.05188608	12	True	Periennial site
East 47 271	small	Warm	010097	LP2168	NORTH BRANCH	24	65.33272824	16	Fals	Periennial site
East 47 271	small	Warm	010111	NE3192	LITTLE MUDDY CREEK	24	66.41057756	18	True	Periennial site
East 47 271	small	Warm	009558	EL2101	MIDDLE LOGAN CREEK	26	44.5982609	14	True	Periennial site
East 47 271	small	Warm	009907	LB2100	ELK CREEK	26	40.13916263	14	True	Periennial site
East 47 271	small	Warm	010114	NE3195	MUDDY CREEK	26	57.6439855	22	True	Periennial site
East 47 271	small	Warm	010196	MT1132	WALNUT CREEK	26	63.06862745	8	Fals	Periennial site
East 47 271	small	Warm	010199	MT1135	WOOD CREEK	26	55.15116734	10	True	Periennial site
East 47 271	small	Warm	009551	LP2160	NORTH OAK CREEK	28	62.11015904	12	True	Periennial site

Table 6. continued

Ecoplace	Strmsize	Coldwarm	STORET	NDEQ_ID	StreamnameE	Habscore5	FishIBI8	BugSc	Thresh1	Reference/Comment
East 47 271	small	Warm	009728	BB1110	WOLF CREEK	28	50.3918665	16	Fals	Periennial site
East 47 271	small	Warm	009901	BB1120	CUB CREEK	28	62.82322589	10	True	Periennial site
East 47 271	small	Warm	010093	LP2164	UNNAMED TRIB. COTTONWOOD CREEK	28	75	8	Fals	Periennial site
East 47 271	small	Warm	010181	EL1096	UNNAMED TRIB. PEBBLE CREEK	28	0	10	True	Periennial site
East 47 271	small	Warm	009564	BB4105	UNNAMED TRIB. TO BIG BLUE RIVER	30	58.53472888	10	True	Periennial site
East 47 271	small	Warm	009584	LB2090	BIG SANDY CREEK (A)	30	49.90413468	26	True	Periennial site
East 47 271	small	Warm	009908	LB2105	SPRING CREEK (LB)	30	52.54818956	12	True	Periennial site
East 47 271	small	Warm	010105	NE2186	UNNAMED TRIB. TURKEY CREEK	30	72.41670574	20	True	Periennial site
East 47 271	small	Warm	010189	EL3105	DRY CREEK	30	64.5		Fals	Periennial site
East 47 271	small	Warm	009555	BB2100	TURKEY CREEK (A)	32	55.37187956	10	True	Periennial site
East 47 271	small	Warm	009712	LB2095	LIBERTY CREEK	32	58.73533311	22	True	Periennial site
East 47 271	small	Warm	009910	BB2101	TURKEY CREEK (B)	32	43.79176219	16	Fals	Periennial site
East 47 271	small	Warm	010182	EL1097	DRY CREEK	32	80.58333333	8	True	Periennial site
East 47 271	small	Warm	009703	NE1177	ERVINE CREEK	34	0	12	True	Periennial site
East 47 271	small	Warm	010186	EL2102	UNNAMED TRIB. LOGAN CREEK	34	0	14	Fals	Periennial site
East 47 271	small	Warm	009714	MT2138	UNNAMED TRIB. SOUTH CREEK	36	0	6	True	No fish
East 47 271	small	Warm	009810	NE2185	LORES BRANCH	36	75.98823224	14	True	Reference
East 47 271	small	Warm	009900	LB1002	COON CREEK	36	77.03125		True	No bugs
East 47 271	small	Warm	009564	BB4105	UNNAMED TRIB. TO BIG BLUE RIVER	38	58.53472888	10	True	Low bugs
East 47 271	small	Warm	009566	NI2365	UNNAMED TRIB. MERRIMAN CREEK	*38	62.5	20	True	Reference
East 47 271	small	Warm	010099	NE1176	RAKES CREEK	*38	57.44744092	16	True	Reference
East 47 271	small	Warm	009713	LB2091	BIG SANDY CREEK (B)	40	42.3245214	6	True	No bugs
East 47 271	small	Warm	009814	LB2115	ROCK CREEK	*46	69.38251965	26	True	Reference
East 47 271	small	Warm	009814	LB2115	ROCK CREEK	*48	69.38251965	26	True	Reference
NE 42	large	Cold	009719	LO2150	NORTH LOUP RIVER (A)	*46	77.10951148	22	True	Reference
NE 42	large	Cold	009581	NI2385	MIDDLE BRANCH VERDIGRE CREEK	*48	84.16477322	26	True	Reference
NE 42	large	Cold	009717	NI2380	N. BRANCH VERDIGRE CREEK	*52	80.71149754	28	True	Reference
NE 42	large	Warm	009983	NI2390	NIOBRARA RIVER (E)	44	51.39011995	16	True	Periennial site

Table 6. continued

Ecoplace	Strmsize	Coldwarm	STORET	NDEQ_ID	StreamnameE	Habscore5	FishIBI8	BugSc	Thresh1	Reference/Comment
NE 42	large	Warm	009984	NI2371	VERDIGRE CREEK (B)	48	51.28316506	28	True	Reference
NE 42	large	Warm	009565	NI2370	VERDIGRE CREEK (A)	52	57.17580055	18	Fals	NPDES
NE 42	small	Warm	009748	NI1238	UNNAMED TRIB. PONCA CREEK	48	89.01420248	8	True	Periennial site
NW 43	large	Cold	010013	NI3420	PLUM CREEK	44	76.19954841	18	True	Reference
NW 43	large	Cold	009582	NI3405	LONG PINE CREEK	48	69.39597317	20	True	Reference
NW 43	mediu	Cold	009707	WH2070	WARBONNET CREEK	36	32.03705657	8	True	Periennial site
NW 43	mediu	Cold	009716	NI3400	UNNAMED TRIB. ROCK CREEK	*48	82.92839637	16	True	Reference
NW 43	mediu	Cold	009715	NI3410	SHORT PINE CREEK	*52	61.1514469	22	True	Reference
NW 43	mediu	Warm	009567	WH1065	WHITE RIVER	32	73.4342048	18	True	Periennial site
NW 43	small	Warm	009985	NI3415	UNNAMED TRIB. NIOBRARA RIVER	44	66.80208332	10	True	Periennial site
Sand 44	large	Cold	009723	NI3395	GORDON CREEK	38	58.15261361	22	True	Periennial site
Sand 44	large	Cold	009816	LO2135	CALAMUS RIVER	40	67.77842765	18	True	Periennial site
Sand 44	large	Cold	010157	NP2105	BLUE CREEK	42	74.21155634	24	True	Periennial site
Sand 44	large	Cold	009811	LO2085	NORTH LOUP RIVER (B)	44	63.72360551	26	True	Periennial site
Sand 44	large	Cold	009730	NP2104	BLUE CREEK	46	55.78199104	24	True	Periennial site
Sand 44	large	Cold	009977	LO2151	NORTH LOUP RIVER (C)	46	76.63705966	24	True	Periennial site
Sand 44	large	Cold	010158	NP2106	BLUE CREEK	46	69.08632711	24	True	Periennial site
Sand 44	large	Cold	009562	LO3171	MIDDLE LOUP RIVER (A)	48	71.25449708	28	True	Periennial site
Sand 44	large	Cold	009720	LO2140	GOOSE CREEK	*50	80.25987831	26	True	Reference
Sand 44	large	Cold	009577	LO3165	N. FORK DISMAL RIVER (A)	*52	49.14840253	24	True	Reference
Sand 44	large	Cold	009979	LO3166	N. FORK DISMAL RIVER (B)	*54	49.64043471	20	True	Reference
Sand 44	large	Warm	009725	EL4109	ELKHORN RIVER (B)	32	74.61174757	20	Fals	Periennial site
Sand 44	large	Warm	009726	EL4110	ELKHORN RIVER (C)	36	75.13667666	26	True	Periennial site

Table 6. continued

Ecoplace	Strmsize	Coldwarm	STORET	NDEQ_ID	StreamnameE	Habscore5	FishIBI8	BugSc	Thresh1	Reference/Comment
Sand 44	large	Warm	010194	EL4013	SOUTH FORK ELKHORN RIVER	40	57.69089171	18	True	Periennial site
Sand 44	large	Warm	009742	NI4393	NIOBRARA RIVER (B)	*42	56.59221008	22	True	Reference
Sand 44	large	Warm	010015	NI3391	NIOBRARA RIVER (D)	*46	65.79018955	22	True	Reference
Sand 44	large	Warm	009588	NI4392	NIOBRARA RIVER (C)	*50	65.82208613	28	True	Reference
Sand 44	mediu	Cold	009596	NI4305	PINE CREEK	32	63.03887016	26	True	Periennial site
Sand 44	mediu	Cold	010167	SP1033	FREMONT SLOUGH (WEST)	32	71.9939357	14	Fals	Periennial site
Sand 44	mediu	Cold	009716	NI3400	UNNAMED TRIB. ROCK CREEK	*46	82.92839637	16	True	Reference
Sand 44	mediu	Cold	009576	LO2145	BIG CREEK	*48	81.64381827	16	True	Reference
Sand 44	mediu	Cold	009715	NI3410	SHORT PINE CREEK	*48	61.1514469	22	True	Reference
Sand 44	small	Cold	010014	NI3425	WILLOW CREEK	44	95.40394346	14	True	Reference
Sand 44	small	Warm	010156	NP2103	ASH CREEK	28	19.42707564	16	True	Periennial site
Sand 44	small	Warm	010193	EL4112	HOLT CREEK	*42	38.00686614	10	True	Reference
West 25 27	large	Cold	009578	NP1100	NORTH PLATTE RIVER	36	65.70769953	20	True	Periennial site
West 25 27	large	Cold	010154	NP1101	NORTH PLATTE RIVER	36	81.78705029	18	Fals	Periennial site
West 25 27	large	Cold	010162	NP3110	NORTH CHANNEL NORTH PLATTE RIVER	36	76.6407197	14	Fals	Periennial site
West 25 27	large	Cold	010159	NP2107	NORTH PLATTE RIVER (South Channne	38	74.33475329	16	True	Periennial site
West 25 27	large	Cold	010169	SP1035	SOUTH PLATTE RIVER (Sutherland)	40	66.24670814		True	Periennial site
West 25 27	large	Cold	010163	NP3111	RED WILLOW CREEK	42	84.82528028	16	Fals	Periennial site
West 25 27	large	Cold	009818	RE3185	FRENCHMAN CREEK (B)	*48	84.82093275	20	True	Reference
West 25 27	large	Cold	009924	RE3094	FRENCHMAN CREEK (A)	*48	64.15564919	22	True	Reference
West 25 27	large	Cold	010155	NP2102	NORTH PLATTE RIVER (North Channel)	52	61.88572307	22	Fals	Impoundment
West 25 27	large	Cold	010164	NP3112	NINEMILE CREEK	*56	59.69481515	24	True	Reference
West 25 27	large	Warm	009982	LO4180	MUD CREEK	26	63.67523972	14	True	Periennial site
West 25 27	large	Warm	009729	RE2151	REPUBLICAN RIVER (B)	30	41.65421877	18	True	Periennial site
West 25 27	large	Warm	009921	RE3210	RED WILLOW CREEK	34	42.83198002	22		Periennial site
West 25 27	large	Warm	010150	MP2057	PLATTE RIVER	34	70.72997881	14	Fals	Periennial site

Table 6. continued

Ecoplace	Strmsize	Coldwarm	STORET	NDEQ_ID	StreamnameE	Habscore5	FishIBI8	BugSc	Thresh1	Reference/Comment
West 25 27	large	Warm	010153	NP1099	NORTH PLATTE RIVER	34	76.21211902	22	True	Periennial site
West 25 27	large	Warm	009553	MP2058	NORTH DRY CREEK	36	46.48775544	12	True	Periennial site
West 25 27	large	Warm	010171	SP1038	PETERSON DITCH	36	42.80758657	14	Fals	Periennial site
West 25 27	large	Warm	009591	LO2037	TURTLE CREEK	38	74.13912025	10	True	Periennial site
West 25 27	large	Warm	009743	RE3152	REPUBLICAN RIVER (C)	38	57.7324004	22	Fals	Periennial site
West 25 27	large	Warm	009580	MP1050	PLATTE RIVER (SIDE CHANNEL)	40	72.58510715	14	True	Periennial site
West 25 27	large	Warm	010168	SP1034	SOUTH PLATTE RIVER	40	48.73084347		True	Periennial site
West 25 27	large	Warm	010180	MP2055	PLATTE RIVER (North Channel)	40	61.8095856	16	True	Periennial site
West 25 27	large	Warm	009980	LO3172	MIDDLE LOUP RIVER (C)	42	60.82402309	16	True	Periennial site
West 25 27	large	Warm	009919	RE2153	REPUBLICAN RIVER (D)	44	39.60813484	22	True	Periennial site
West 25 27	large	Warm	009922	RE3154	REPUBLICAN RIVER (E)	44	61.51387706	12	Fals	Periennial site
West 25 27	large	Warm	009981	LO4175	SOUTH LOUP RIVER	44	68.5706779	18	True	Periennial site
West 25 27	large	Warm	010177	MP2052	PLATTE RIVER (Issac Walton)	46	63.70463789	6	True	Periennial site
West 25 27	large	Warm	010178	MP2053	PLATTE RIVER	46	63.54209484	12	True	Periennial site
West 25 27	large	Warm	009563	LO3170	MIDDLE LOUP RIVER (B)	*48	54.11940337	16	True	Reference
West 25 27	large	Warm	009587	RE1150	REPUBLICAN RIVER (A)	*48	52.2843441	16	True	Reference
West 25 27	large	Warm	010165	SP1031	SOUTH PLATTE RIVER (Centennial Pa	*48	65.10243056	12	True	Reference
West 25 27	large	Warm	009925	RE3113	REPUBLICAN RIVER (F)	*50	42.01002547	16	True	Reference
West 25 27	mediu	Cold	009916	RE3190	SPRING CREEK	26	83.71033134	22	True	Periennial site
West 25 27	mediu	Cold	010161	NP2109	UNNAMED TRIB. CEDAR CREEK	32	62.7009254	14	True	Periennial site
West 25 27	mediu	Cold	010166	SP1032	FREMONT SLOUGH (MIDDLE)	32	87.81506924	22	Fals	Periennial site
West 25 27	mediu	Cold	009595	WH1037	MIDDLE FORK SOLDIER CREEK	*48	64.4584595	24	True	Reference
West 25 27	mediu	Cold	009709	RE1170	CENTER CREEK	*48	53.88249798	20	True	Reference
West 25 27	mediu	Cold	009740	SP2042	LODGEPOLE CREEK	*48	74.80687458	16	True	Reference
West 25 27	mediu	Cold	010160	NP2108	RUSH CREEK	*48	64.38481503	22	True	Reference
West 25 27	mediu	Warm	010088	LP1156	SHELL CREEK	24	34.4318995	14	Fals	Periennial site
West 25 27	mediu	Warm	010172	SP2039	HIGHLINE CANAL	26	0	14	Fals	Periennial site
West 25 27	mediu	Warm	009738	LO2155	DAVIS CREEK	28	76.16577554	24	True	Periennial site

Table 6. continued

Ecoplace	Strmsize	Coldwarm	STORET	NDEQ_ID	StreamnameE	Habscore5	FishIBI8	BugSc	Thresh1	Reference/Comment
West 25 27	mediu	Warm	009721	LO1130	S. BRANCH TIMBER CREEK	30	67.09880715	12	True	Periennial site
West 25 27	mediu	Warm	009738	LO2155	DAVIS CREEK	30	76.16577554	24	True	Periennial site
West 25 27	mediu	Warm	009918	RE2200	SAPPA CREEK	30	27.71119404	16	True	Periennial site
West 25 27	mediu	Warm	009920	RE2205	PRAIRIE DOG CREEK	30	44.81860033	12	True	Periennial site
West 25 27	mediu	Warm	009978	LO2161	MUNSON CREEK (B)	32	34.71671225	20	True	Periennial site
West 25 27	mediu	Warm	009708	LO2160	MUNSON CREEK (A)	34	69.15558075	18	True	Periennial site
West 25 27	mediu	Warm	009724	SP1037	SOUTH PLATTE RIVER (Brule)	34	54.8950208	16	True	Periennial site
West 25 27	mediu	Warm	010170	SP1036	SOUTH PLATTE RIVER (Brule)	34	50.72539512	10	True	Periennial site
West 25 27	mediu	Warm	010151	MP2059	SPRING CREEK	36	74.13521329	22	True	Periennial site
West 25 27	mediu	Warm	010152	MP2061	PAWNEE CREEK	38	74.57907988	22	True	Reference
West 25 27	mediu	Warm	010174	SP2019	LODGEPOLE CREEK	38	68.54297658	8	True	Reference
West 25 27	mediu	Warm	009573	MP2060	SPRING CREEK	40	60.87297423	12	Fals	Channelized
West 25 27	mediu	Warm	010179	MP2054	WOOD RIVER	*44	48.00886255	16	True	Reference
West 25 27	mediu	Warm	009817	RE1181	FARMERS CREEK	*46	68.63907215	24	True	Reference
West 25 27	mediu	Warm	010175	MP2062	PAWNEE CREEK	*48	69.86501298	26	True	Reference
West 25 27	small	Cold	009702	NP3113	DRY SPOTTEDTAIL CREEK	34	50.18020466	20	True	Periennial site
West 25 27	small	Cold	009926	RE1040	COTTONWOOD CREEK	*48	64.08227831	14	True	Reference
West 25 27	small	Cold	009594	WH2049	MONROE CREEK	*50	41.56956987	24	True	Reference
West 25 27	small	Cold	009926	RE1040	COTTONWOOD CREEK	*50	64.08227831	14	True	Reference
West 25 27	small	Warm	009554	RE2160	BEAVER CREEK (A)	20	28.19264418	14	True	Periennial site
West 25 27	small	Warm	009710	RE2161	BEAVER CREEK (B)	22	33.64642861	16	True	Periennial site
West 25 27	small	Warm	009559	RE1165	EAST PENNY CREEK	26	19.42707564		True	Periennial site
West 25 27	small	Warm	009711	RE1175	HICKS CREEK	30	68.31301176	10	True	Periennial site
West 25 27	small	Warm	010176	MP1051	SILVER CREEK	36	67.25584726	12	True	Low bugs
West 25 27	small	Warm	009917	RE3195	MUDDY CREEK	*42	55.67219558	20	True	Reference
West 25 27	small	Warm	010173	SP2040	LODGEPOLE CREEK	44	52.74518488	8	True	Low bugs

Table 7. Significant differences between metrics using Duncan's Multiple Range Analysis of Variance Test ($p<0.05$) for the IBI fish index and six ecoregions for reference streams and perennial random selected in Nebraska, R-EMAP, 1997-2001. Metrics not on list show no significant difference. Overlapping lines indicate a similiarity between ecoregions and nonoverlapping lines indicate a difference between ecoregions.

Duncan's Test ($p< 0.05$)	Ecoregions
Perennial Streams	
Total Number of Sensitive Species	44 42 25 43 27 47
Total Number of Tolerant Species	25 44 42 27 47 43
Total Number of Benthic Species	42 44 25 43 47 27
Number of Carnivore Species	43 42 47 27 44 25
Reference Streams	
Total Number of Sensitive Species	43 44 25 42 47 27
Total Number of Tolerant Species	25 43 44 42 27 47
Total Number of Benthic Species	44 42 43 47 27 25
Total Number of Long-Lived Species	42 27 43 44 47 25

Table 8. Significant differences using Duncan's Multiple Range Analysis of Variance Test ($p<0.05$) between metrics used in the IBI fish index and seven ecoregions for reference streams and randomly selected perennial streams in Nebraska, R-EMAP, 1997-2001. Metrics not on list show no significant diference. Overlapping lines indicate a similarity between ecoregions and nonoverlapping lines indicate a differnce between ecoregions. Ecoregion 27 is divided into the western end (27) and the eastern end (271).

Metrics	Ecoregions
Perennial Streams	
Total Number of Native Species	42 27 44 25 43 47 271
Total Number of Sensitive Species	44 42 25 27 43 47 271
Total Number of Benthic Species	42 44 25 27 47 43 271
Total Number of Sensitive Species Score	44 42 25 27 43 47 271
Total Number of Tolerant Species Score	25 44 42 27 47 43 271
Total Number of Benthic Species Score	42 44 25 43 27 47 271
Total Number of Carnivore Species Score	43 271 42 47 44 27 25
Reference Streams	
Total Number of Native Sensitive Species	44 43 42 25 47 27 271
Total Number of Tolerant Species	271 42 47 27 44 43 25
Total Number of Benthic Species	42 44 47 43 27 271 25
Total Number of Carnivore Species	42 271 44 25 47 27 43
Total Numbr of Sensitive Species Score	43 44 25 42 47 27 271

Table 8 . continued

Metrics	Ecoregions
Total Number of Tolerant Species Score	25 43 44 42 271 27 47
Total Number of Benthic Species Score	44 42 43 47 27 271 25
Total Number of Long-lived Species Score	42 271 27 43 44 47 25

Table 9. Significant difference using Duncan's Multiple Range Analysis of Variance Test ($p<0.05$) between metrics used in the ICI macroinvertebrate index and ecoregions for rerference streams and randomly selected perennial streams in Nebraska, R-EMAP, 1997-2001. Metrics not on list show no significant difference. Overlapping lines indicate a similiarity between ecoregions and nonoverlapping lines indicate a difference between ecoregions. Ecoregion 27 is divided into the western end (27) and the eastern end (271).

Metrics	Ecoregions
Perennial Streams	
Total Number of Invertebrate Taxa	44 42 47 271 27 43 25
Modified Hisenhoff Biotic Index	42 43 27 47 271 44 25
Percent Contribution of Dominant Taxon	42 271 47 44 27 25 43
Total Number of Invertebrate Taxa Score	44 42 47 27 271 43 25
HBI Score	271 44 25 47 27 43 42
Percent Contribution of Dominant Taxon Score	43 44 27 25 47 271 42
ICI Score	44 47 27 271 25 43 42
Reference Streams	
Total Number of Invertebrate Taxon	44 271 25 47 27 42 43
EPT Taxa Richness	44 271 42 47 25 27 43
Percent Contribution of Dominant Taxon	43 25 27 44 271 47 42
Percent Contribution of Dominant Taxon Score	42 271 27 47 25 44 43
ICI Score	42 271 44 25 47 27 43

Table 10. Table of reference and random site divisions.

Level	Type	Explanation
Ecoregion III or IV		
	East	47 (Western Cornbelt Plains)
		27f (Rainwater Basin Plains)
		27g (Platte River Valley)
	Sand Hills	44 (Nebraska Sand Hills)
	West	25 (Western High Plains)
		43 (Northwesetern Great Plains)
		27b (Rolling Plains and Breaks)
		27e (Central Nebraska Loess Plains)
	Northeast	42 (Northwestern Glaciated Plains)
Stream Size		
	Small	Flow < 1 cfs
	Medium	Flow 1-10 cfs
	Large	Flow > 10 cfs
Water Temperature		
	Cold	Maximum temperature limit is 72 F (22 C)
	Warm	Maximum temperature limit is 90 F (32 C)

Table 11. Fish families by abundance collected in EPA Ecoregions in Nebraska. Based on R-EMAP studies 1997-2001.

Ecoregion	Family Name	Frequency	Percent	Cumulative Frequency	Cumulative Percent
25*	Fundulidae	5317	48.44	5317	48.44
	Catostomidae	1407	12.82	6724	61.26
	Cyprinidae	1334	12.15	8058	73.41
	Percidae	691	6.29	8749	79.71
	Clupeidae	646	5.89	9395	85.59
	Ictaluridae	586	5.34	9981	90.93
	Salmonidae	550	5.01	10531	95.94
	Gasterosteidae	348	3.17	10879	99.11
	Centrarchidae	73	0.67	10952	99.77
	Poeciliidae	18	0.16	10970	99.94
	Moronidae	6	0.05	10976	99.99
	Esocidae	1	0.01	10977	100.00
27*	Cyprinidae	35821	86.65	35821	86.65
	Ictaluridae	1252	3.03	37073	89.68
	Catostomidae	1173	2.84	38246	92.52
	Fundulidae	975	2.36	39221	94.87
	Clupeidae	916	2.22	40137	97.09
	Centrarchidae	861	2.08	40998	99.17
	Poeciliidae	161	0.39	41159	99.56
	Percidae	113	0.27	41272	99.84
	Sciaenidae	35	0.08	41307	99.92
	Atherinidae	24	0.06	41331	99.98
	Moronidae	6	0.01	41337	99.99
	Lepisosteidae	4	0.01	41341	100.00
42*	Cyprinidae	3197	76.56	3197	76.56
	Ictaluridae	345	8.26	3542	84.82
	Centrarchidae	341	8.17	3883	92.99
	Catostomidae	264	6.32	4147	99.31
	Percidae	22	0.53	4169	99.84
	Clupeidae	4	0.10	4173	99.93
	Sciaenidae	2	0.05	4175	99.98
	Esocidae	1	0.02	4176	100.00
43*	Cyprinidae	1849	84.86	1849	84.86
	Catostomidae	190	8.72	2039	93.58

Table 11. continued

Ecoregion	Family Name	Frequency	Percent	Cumulative Frequency	Cumulative Percent
	Centrarchidae	101	4.64	2140	98.21
	Ictaluridae	37	1.70	2177	99.91
	Salmonidae	2	0.09	2179	100.00
44*	Cyprinidae	19348	82.46	19348	82.46
	Centrarchidae	1847	7.87	21195	90.33
	Catostomidae	1436	6.12	22631	96.45
	Percidae	225	0.96	22856	97.41
	Ictaluridae	221	0.94	23077	98.35
	Fundulidae	215	0.92	23292	99.27
	Gasterosteidae	111	0.47	23403	99.74
	Clupeidae	34	0.14	23437	99.88
	Esocidae	16	0.07	23453	99.95
	Salmonidae	9	0.04	23462	99.99
	Sciaenidae	2	0.01	23464	100.00
47*	Cyprinidae	36250	90.62	36250	90.62
	Ictaluridae	1642	4.10	37892	94.72
	Centrarchidae	1332	3.33	39224	98.05
	Catostomidae	394	0.98	39618	99.04
	Sciaenidae	167	0.42	39785	99.46
	Percidae	165	0.41	39950	99.87
	Fundulidae	30	0.07	39980	99.94
	Lepisosteidae	8	0.02	39988	99.96
	Gasterosteidae	7	0.02	39995	99.98
	Clupeidae	6	0.01	40001	100.00
	Hiodontidae	1	0.00	40002	100.00
	Poeciliidae	1	0.00	40003	100.00
271*	Cyprinidae	3491	79.56	3491	79.56
	Centrarchidae	444	10.12	3935	89.68
	Ictaluridae	169	3.85	4104	93.53
	Percidae	165	3.76	4269	97.29
	Catostomidae	113	2.58	4382	99.86
	Fundulidae	6	0.14	4388	100.00

Table 11. continued

*Ecoregion 25 - Western High Plains
Ecoregion 27 - Central Great Plains, western (includes subecoregions 27b, 27e, and 27g)
Ecoregion 42 – Northwestern Glaciated Plains
Ecoregion 43 – Northwestern Great Plains
Ecoregion 44 – Nebraska Sand Hills
Ecoregion 47 – Western Corn Belt Plains
Ecoregion 271 – Central Great Plains, eastern (includes subecoregions 27a and 27f)

Table 12. Minimum, 25th percentile, median, 75th percentile, maximum, and number of samples for fish metrics and fish metric scores taken during R-EMAP sampling in Nebraska, 1997-2001.

Ecoregion	Metric/Stream Type/Ecoregion	Minimum	25%tile	Median	75%tile	Maximum	Number Sampled
Metric Values							
all	IBI8-p-all*	0	44.04	56.41	67.8	95.4	152
	IBI8-r-all	41.56	53.88	62.5	69.39	84.82	47
25	IBI8-p-25	0	50.45	62.29	75.48	84.82	16
	IBI8-r-25	41.56	42.01	64.38	74.8	84.82	7
27	IBI8-p-27	19.42	42.83	63.54	69.15	87.81	35
	IBI8-r-27	48	54	59.87	66.39	69.86	8
271	IBI8-p-271	40.13	43.79	51	58.53	77.03	13
	IBI8-r-271	46.91	46.91	68.28	69.38	69.38	3
42	IBI8-p-42	51.39	51.39	57.17	89.01	89.01	3
	IBI8-r-42	51.28	64.1	78.91	82.43	84.16	4
43	IBI8-p-43	32.03	32.03	66.8	73.43	73.43	3
	IBI8-r-43	61.15	65.27	72.79	79.56	82.92	4
44	IBI8-p-44	19.42	57.69	67.77	74.21	95.4	17
	IBI8-r-44	49.14	56.59	65.8	80.25	81.64	6
47	IBI8-p-47	0	42.26	50.39	59.81	90.8	65
	IBI8-r-47	43.06	52.08	60.45	62.5	75.98	15
all	numnatsp-p-all	0	6	9	14	24	152
	numnatsp-r-all	1	6	11	13	23	47
25	numnatsp-p-25	0	5.5	12	16.5	24	16
	numnatsp-r-25	1	3	5	11	19	7
27	numnatsp-p-27	1	7	12	19	22	35
	numnatsp-r-27	5	6	10	12	17	8
271	numnatsp-p-271	3	5	6	9	11	13
	numnatsp-r-271	6	6	13	15	15	3
42	numnatsp-p-42	13	13	14	16	16	3
	numnatsp-r-42	11	11.5	12.5	16	19	4
43	numnatsp-p-43	1	1	9	9	9	3
	numnatsp-r-43	4	5	9	14.5	17	4
44	numnatsp-p-44	1	8	11	14	23	17
	numnatsp-r-44	5	11	12.5	15	16	6
47	numnatsp-p-47	0	2	3	4	8	65
	numnatsp-r-47	1	7	9	13	23	15
all	numfamly-p-all	0	3	4	5	9	152
	numfamly-r-all	1	3	4	5	8	47
25	numfamly-p-25	0	3	4	6	8	16
	numfamly-r-25	1	2	3	5	8	7
27	numfamly-p-27	1	4	5	7	9	35
	numfamly-r-27	2	3.5	4	5	5	8
271	numfamly-p-271	2	3	3	4	5	13

Table 12. continued

Ecoregion	Metric/Stream Type/Ecoregion	Minimum	25%tile	Median	75%tile	Maximum	Number Sampled
	numfamly-r-271	4	4	5	5	5	3
42	numfamly-p-42	4	4	5	7	7	3
	numfamly-r-42	4	4	4	4.5	5	4
43	numfamly-p-43	1	1	4	4	4	3
	numfamly-r-43	2	2	3	4.5	5	4
44	numfamly-p-44	1	4	5	6	7	17
	numfamly-r-44	4	4	5	5	6	6
47	numfamly-p-47	0	2	3	4	8	65
	numfamly-r-47	1	3	4	5	7	15
all	numsensitive-p-all	0	0	0	1	5	152
	numsensitive-r-all	0	0	0	1	5	47
25	numsensitive-p-25	0	0	0.5	1.5	4	16
	numsensitive-r-25	0	0	1	1	2	7
27	numsensitive-p-27	0	0	1	2	2	35
	numsensitive-r-27	0	0	0	0	1	8
271	numsensitive-p-271	0	0	0	0	0	13
	numsensitive-r-271	0	0	0	0	0	3
42	numsensitive-p-42	0	0	1	1	1	3
	numsensitive-r-42	0	0.5	1	1.5	2	4
43	numsensitive-p-43	0	0	0	1	1	3
	numsensitive-r-43	1	1.5	2	2	2	4
44	numsensitive-p-44	0	1	1	3	5	17
	numsensitive-r-44	1	1	1.5	3	5	6
47	numsensitive-p-47	0	0	0	0	3	65
	numsensitive-r-47	0	0	0	1	4	15
all	proportolerant-p-all	0	0.551	0.753	0.928	1	147
	proportolerant-r-all	0	0.384	0.647	0.806	1	47
25	proportolerant-p-25	0.03	0.253	0.391	0.668	0.942	15
	proportolerant-r-25	0	0	0.251	0.451	0.833	7
27	proportolerant-p-27	0.111	0.571	0.81	0.949	1	35
	proportolerant-r-27	0.299	0.52	0.784	0.944	0.944	8
271	proportolerant-p-271	0.5	0.87	0.935	0.995	1	13
	proportolerant-r-271	0.384	0.384	0.574	0.831	0.831	3
42	proportolerant-p-42	0.523	0.523	0.69	0.719	0.719	3
	proportolerant-r-42	0.351	0.44	0.589	0.651	0.652	4
43	proportolerant-p-43	0	0	0.796	0.824	0.824	3
	proportolerant-r-43	0.018	0.148	0.309	0.557	0.775	4
44	proportolerant-p-44	0.04	0.383	0.676	0.864	1	17
	proportolerant-r-44	0.384	0.384	0.574	0.831	0.831	3
47	proportolerant-p-47	0	0.689	0.775	0.928	1	61
	proportolerant-r-47	0.414	0.671	0.734	0.895	1	15

Table 12. continued

Ecoregion	Metric/Stream Type/Ecoregion	Minimum	25%tile	Median	75%tile	Maximum	Number Sampled
all	proporbenthsp-p-all	0	0.043	0.315	0.515	0.971	147
	proporbenthsp-r-all	0	0.145	0.307	0.549	0.964	47
25	proporbenthsp-p-25	0	0.026	0.427	0.673	0.82	15
	proporbenthsp-r-25	0	0.037	0.056	0.307	0.379	7
27	proporbenthsp-p-27	0	0	0.2	0.482	0.738	35
	proporbenthsp-r-27	0.024	0.1225	0.229	0.376	0.482	8
271	proporbenthsp-p-271	0	0	0.03	0.056	0.635	13
	proporbenthsp-r-271	0	0	0.124	0.162	0.162	3
42	proporbenthsp-p-42	0.1	0.1	0.232	0.445	0.445	3
	proporbenthsp-r-42	0.139	0.2	0.424	0.61	0.634	4
43	proporbenthsp-p-43	0	0	0.381	0.458	0.458	3
	proporbenthsp-r-43	0.416	0.558	0.798	0.93	0.964	4
44	proporbenthsp-p-44	0	0.155	0.352	0.518	0.884	17
	proporbenthsp-r-44	0.094	0.515	0.567	0.585	0.647	6
47	proporbenthsp-p-47	0	0.13	0.357	0.555	0.971	61
	proporbenthsp-r-47	0	0.204	0.28	0.549	0.804	15
all	numlonglivesp-p-all	0	3	5	8	15	152
	numlonglivesp-r-all	0	4	6	8	14	47
25	numlonglivesp-p-25	0	3.5	5.5	8	13	16
	numlonglivesp-r-25	0	1	4	5	14	7
27	numlonglivesp-p-27	0	5	7	10	14	35
	numlonglivesp-r-27	2	5	6	7.5	9	8
271	numlonglivesp-p-271	2	3	4	5	8	13
	numlonglivesp-r-271	6	6	6	10	10	3
42	numlonglivesp-p-42	8	8	8	9	9	3
	numlonglivesp-r-42	6	6.5	7	10	13	4
43	numlonglivesp-p-43	1	1	5	6	6	3
	numlonglivesp-r-43	2	2	5.5	9.5	10	4
44	numlonglivesp-p-44	0	3	4	7	13	17
	numlonglivesp-r-44	2	4	4.5	8	9	6
47	numlonglivesp-p-47	0	3	5	7	15	65
	numlonglivesp-r-47	1	3	5	8	10	15
all	proporcarn-p-all	0	0.015	0.092	0.301	1	147
	proporcarn-r-all	0	0.047	0.17	0.41	1	47
25	proporcarn-p-25	0	0.005	0.03	0.301	0.604	15
	proporcarn-r-25	0	0.001	0.348	0.469	0.677	7
27	proporcarn-p-27	0	0.007	0.045	0.129	0.981	35
	proporcarn-r-27	0.001	0.07	0.185	0.499	0.549	8
271	proporcarn-p-271	0.021	0.126	0.2	0.356	0.667	13
	proporcarn-r-271	0.045	0.045	0.234	0.41	0.41	3

Table 12. continued

Ecoregion	Metric/Stream Type/Ecoregion	Minimum	25%tile	Median	75%tile	Maximum	Number Sampled
42	proporcarn-p-42	0.011	0.011	0.054	0.456	0.456	3
	proporcarn-r-42	0.128	0.151	0.279	0.492	0.6	4
43	proporcarn-p-43	0	0	0.301	0.32	0.32	3
	proporcarn-r-43	0.018	0.022	0.098	0.205	0.24	4
44	proporcarn-p-44	0	0.007	0.015	0.307	0.723	17
	proporcarn-r-44	0.002	0.056	0.081	0.109	0.134	6
47	proporcarn-p-47	0	0.025	0.096	0.333	1	61
	proporcarn-r-47	0.012	0.047	0.211	0.428	1	15
Metric Scores							
all	natspScore-p-all	0	4.12	6.24	8.48	10	152
	natspScore-r-all	1.14	5.05	6.25	8.51	10	47
25	natspScore-p-25	0	5.15	6.88	8.49	10	16
	natspScore-r-25	1.14	2.54	5.05	7.06	10	7
27	natspScore-p-27	1.43	3.97	7.5	9.73	10	35
	natspScore-r-27	4.14	5.18	6.81	7.3	10	8
271	natspScore-p-271	1.89	3.61	5.97	7.45	10	13
	natspScore-r-271	2.88	2.88	9.23	10	10	3
42	natspScore-p-42	5.41	5.41	6.93	10	10	3
	natspScore-r-42	5.72	6.82	8.26	8.81	9.02	4
43	natspScore-p-43	0.98	0.98	7.09	8.24	8.24	3
	natspScore-r-43	3.94	5.26	6.77	7.9	8.85	4
44	natspScore-p-44	1.43	5.57	6.74	8.39	10	17
	natspScore-r-44	3.3	5.7	6.3	10	10	6
47	natspScore-p-47	0	4.07	5.27	7.72	10	65
	natspScore-r-47	4.81	5.3	5.83	8.4	10	15
all	natfamScore-p-all	0	4.44	6.66	8.55	10	152
	natfamScore-r-all	3.05	5.35	6.29	7.95	10	47
25	natfamScore-p-25	0	6.05	7.01	7.98	10	16
	natfamScore-r-25	3.05	4.25	5.48	9.69	10	7
27	natfamScore-p-27	1.66	5.37	7.35	8.88	10	35
	natfamScore-r-27	4.13	5.91	6.73	8.47	9.82	8
271	natfamScore-p-271	3.33	4.87	6.66	8.36	10	13
	natfamScore-r-271	4.46	4.46	8.42	8.64	8.64	3
42	natfamScore-p-42	4.44	4.44	7.77	10	10	3
	natfamScore-r-42	4.44	5	6.14	7.22	7.72	4
43	natfamScore-p-43	2.52	2.52	7.79	9.3	9.3	3
	natfamScore-r-43	5.08	5.12	5.63	6.15	6.21	4
44	natfamScore-p-44	2.99	6.61	6.84	8.49	10	17
	natfamScore-r-44	4.88	6.22	6.58	7.77	10	6
47	natfamScore-p-47	0	3.86	5.42	8.31	10	65
	natfamScore-r-47	3.31	5.35	7.29	8.7	10	15

Table 12. continued

Ecoregion	Metric/Stream Type/Ecoregion	Minimum	25%tile	Median	75%tile	Maximum	Number Sampled
all	sensitScore-p-all	0	0	0	4.37	10	152
	sensitScore-r-all	0	0	0	5.46	10	47
25	sensitScore-p-25	0	0	1.16	7.13	10	16
	sensitScore-r-25	0	0	3.71	9.04	10	7
27	sensitScore-p-27	0	0	2.51	6.17	10	35
	sensitScore-r-27	0	0	0	0	2.12	8
271	sensitScore-p-271	0	0	0	0	0	13
	sensitScore-r-271	0	0	0	0	0	3
42	sensitScore-p-42	0	0	2.72	7.69	7.69	3
	sensitScore-r-42	0	2.35	4.76	5.13	5.46	4
43	sensitScore-p-43	0	0	0	5.51	5.51	3
	sensitScore-r-43	6.71	6.93	7.25	8.68	10	4
44	sensitScore-p-44	0	3.91	4.74	7.86	10	17
	sensitScore-r-44	2.42	3.36	5.7	10	10	6
47	sensitScore-p-47	0	0	0	0	10	65
	sensitScore-r-47	0	0	0	3.12	6.31	15
all	tolrntScore-p-all	0	0.75	2.77	5.3	10	152
	tolrntScore-r-all	0	2.42	4.41	7.7	10	47
25	tolrntScore-p-25	0	4.06	7.57	9.18	10	16
	tolrntScore-r-25	2.08	6.86	9.36	10	10	7
27	tolrntScore-p-27	0	0.63	2.37	5.36	10	35
	tolrntScore-r-27	0.07	0.7	2.7	6	8.7	8
271	tolrntScore-p-271	0	0.06	0.81	1.62	6.25	13
	tolrntScore-r-271	2.11	2.11	5.32	7.7	7.7	3
42	tolrntScore-p-42	0	0	0	5.51	5.51	3
	tolrntScore-r-42	4.35	4.36	5.13	7	8.11	4
43	tolrntScore-p-43	2.2	2.2	2.55	10	10	3
	tolrntScore-r-43	2.81	5.53	8.63	9.51	10	4
44	tolrntScore-p-44	0	1.7	4.05	7.71	10	17
	tolrntScore-r-44	4.41	5.18	5.4	6.06	10	6
47	tolrntScore-p-47	0	0.44	2.2	3.52	10	65
	tolrntScore-r-47	0	1.23	3.12	3.87	6.89	15
all	benthicScoresp-p-all	0	2.36	5.16	8.21	10	152
	benthicScoresp-r-all	0	3.2	6.82	8.34	10	47
25	benthicScoresp-p-25	0	4.42	6.3	8.33	10	16
	benthicScoresp-r-25	0	1.71	2.65	3.92	8.49	7
27	benthicScoresp-p-27	0	0	6.04	8.33	10	35
	benthicScoresp-r-27	2.92	4.01	6.91	8.28	8.34	8
271	benthicScoresp-p-271	0	0	3.56	5.2	10	13
	benthicScoresp-r-271	0	0	6.7	6.91	6.91	3

Table 12. continued

Ecoregion	Metric/Stream Type/Ecoregion	Minimum	25%tile	Median	75%tile	Maximum	Number Sampled
42	benthicScoresp-p-42	3.33	3.33	8.33	10	10	3
	benthicScoresp-r-42	5	6.66	9.16	10	10	4
43	benthicScoresp-p-43	0	0	3.34	8.01	8.01	3
	benthicScoresp-r-43	6.66	7.09	8.76	10	10	4
44	benthicScoresp-p-44	0	6.12	7.24	10	10	17
	benthicScoresp-r-44	2.13	8.12	8.33	9.23	10	6
47	benthicScoresp-p-47	0	2.42	4.78	6.52	10	65
	benthicScoresp-r-47	0	4.65	6.73	8.85	10	15
all	longliveScore-p-all	0	3.85	6.6	9.93	10	152
	longliveScore-r-all	0	4.71	6.64	9.56	10	47
25	longliveScore-p-25	0	5.69	7.32	8.74	10	16
	longliveScore-r-25	0	1.77	6.07	8.07	10	7
27	longliveScore-p-27	0	6.36	8.18	10	10	35
	longliveScore-r-27	3.44	7.67	8.03	9.47	10	8
271	longliveScore-p-271	3.63	5.51	7.32	10	10	13
	longliveScore-r-271	5.48	5.48	8.59	10	10	3
42	longliveScore-p-42	7.27	7.27	8.18	10	10	3
	longliveScore-r-42	6.36	8	9.69	9.87	10	4
43	longliveScore-p-43	2.12	2.12	8.11	10	10	3
	longliveScore-r-43	4.28	4.79	7.43	9.78	10	4
44	longliveScore-p-44	0	2.73	5.45	9.22	10	17
	longliveScore-r-44	2.68	4	6.2	8.18	10	6
47	longliveScore-p-47	0	2.96	4.7	8.66	10	65
	longliveScore-r-47	3.49	4.11	5.56	7.14	10	15
all	carnScore-p-all	0	..5	3.94	10	10	152
	carnScore-r-all	0	2.86	6.8	10	10	47
25	carnScore-p-25	0	0.16	0.84	7.5	10	16
	carnScore-r-25	0	0.04	10	10	10	7
27	carnScore-p-27	0	0.28	1.8	5.16	10	35
	carnScore-r-27	0.04	2.8	7.42	10	10	8
271	carnScore-p-271	0.84	5.04	8	10	10	13
	carnScore-r-271	1.8	1.8	9.36	10	10	3
42	carnScore-p-42	0.44	0.44	2.16	10	10	3
	carnScore-r-42	5.12	6.04	8.48	10	10	4
43	carnScore-p-43	0	0	10	10	10	3
	carnScore-r-43	0.72	0.88	3.92	8.2	9.6	4
44	carnScore-p-44	0	0.28	0.06	10	10	17
	carnScore-r-44	0.08	2.24	3.24	4.36	5.36	6
47	carnScore-p-47	0	10	10	10	10	65
	carnScore-r-47	0.8	3.13	10	10	10	15

* p - perennial; r - reference

Table 13. Median and mean values of IBI Fish Scores for each ecoregion in Nebraska, R-EMAP, 1997-2001.

Ecoregion	**Perennial Sites**			**Reference Sites**		
	Median	**Mean**	**Number**	**Median**	**Mean**	**Number**
Eastern Nebraska						
47	50.9	50.4	65	60.4	57.3	15
27	63.6	57.6	35	59.8	59.8	8
Western Nebraska						
44	64.4	63.6	17	65.7	66.5	6
42	73.0	73.0	2	77.1	68.9	5
25	62.2	60.0	16	64.3	61.6	7
271	51.7	52.11	13	68.2	61.5	3
43	70.1	70.1	2	72.7	63.3	5
All sites	56.9	55.3		61.1	61.6	

Table 14. Summary of top two percent or greater of macroinvertebrate taxa in each ecoregion of Nebraska. Based on R-EMAP studies, 1997-2001. Ecoregion 25 – Western High Plains, Ecoregion 27 – Central Great Plains, western (includes subsecoregions 27b, 27e, and 27g), Ecoregion 42 – Northwestern Glaciated Plains, Ecoregion 43 – Northwestern Great Plains, Ecoregion 44 – Nebraska Sand Hills, Ecoregion 47 – Western Corn Belt Plains, and Ecoregion 271 – Central Great Plains, eastern (includes subecoregions 27a and 27f).

Ecoregion	FinalID	Number Collected at all sites	Percent	Taxa	Number of sites where taxa is predominant (> 50%)
25	Simuliidae	34168	14.48	1 taxa	
25	Tricorythodes	24860	10.53	1 taxa	
25	Baetis	20447	8.66	1 taxa	1 site
25	Hydropsyche	19696	8.35	6 taxa	4 sites
25	Heptagenia	16419	6.96	1 taxa	1 site
25	Acentrella	10613	4.50	1 taxa	1 site
25	Cricotopus	7601	3.22	1 taxa	1 site
25	Cheumatopsyche	6182	2.62	1 taxa	1 site
25	Caenis	5602	2.37	1 taxa	3 sites
25	Ceratopsyche	5466	2.32	4 taxa	1 site
25	Tubificidae, immature	5102	2.16	1 taxa	
25	Limnodrilus	4721	2.00	3 taxa	
27	Rheotanytarsus	62633	11.72	1 taxa	
27	Tanytarsus	42164	7.89	1 taxa	
27	Dicrotendipes	36447	6.82	1 taxa	
27	Tubificidae, immature	30393	5.69	1 taxa	
27	Polypedilum	22833	4.27	10 taxa	
27	Gammarus	22176	4.15	1 taxa	
27	Tricorythodes	21942	4.11	1 taxa	3 sites
27	Baetis	18819	3.52	1 taxa	
27	Dero	18510	3.46	4 taxa	
27	Hydropsyche	17274	3.23	7 taxa	
27	Stenacron	13351	2.50	2 taxa	4 sites
27	Dubiraphia	12908	2.42	1 taxa	1 site
27	Nais	11180	2.09	8 taxa	
27	Cladotanytarsus	10950	2.05	1 taxa	
27	Caenis	10845	2.03	1 taxa	
42	Tanytarsus	5613	10.53	1 taxa	1 site
42	Caenis	5331	10.00	1 taxa	
42	Rheocricotopus	3902	7.32	1 taxa	
42	Tricorythodes	3305	6.20	1 taxa	2 sites
42	Limnodrilus	2493	4.68	3 taxa	
42	Polypedilum	2424	4.55	8 taxa	1 site
42	Fallceon	2401	4.50	1 taxa	
42	Simuliidae	2313	4.34	1 taxa	

Table 14. continued

Ecoregion	FinalID	Number Collected at all sites	Percent	Taxa	Number of sites where taxa is predominant (> 50%)
42	Physa	2186	4.10	1 taxa	
42	Dero	2185	4.10	4 taxa	
42	Baetis	1809	3.39	1 taxa	
42	Microcylloepus	1616	3.03	2 taxa	
42	Hydropsyche	1333	2.50	6 taxa	
42	Parametriocnemus	1147	2.15	1 taxa	
43	Nais	10199	26.63	5 taxa	1 site
43	Cricotopus	5968	15.59	3 taxa	
43	Rheocricotopus	3822	9.98	1 taxa	1 site
43	Hydropsyche	1760	4.60	5 taxa	
43	Rheotanytarsus	1699	4.44	1 taxa	1 site
43	Tricorythodes	1267	3.31	1 taxa	1 site
43	Polypedilum	1224	3.20	8 taxa	
43	Ceratopsyche	1197	3.13	3 taxa	
43	Tubificidae, immature	1110	2.90	1 taxa	
43	Parakiefferiella	918	2.40	1 taxa	
44	Hydropsyche	107112	16.44	4 taxa	2 sites
44	Rheotanytarsus	52575	8.07	1 taxa	5 sites
44	Nais	52349	8.03	9 taxa	4 sites
44	Brachycentrus	49901	7.66	1 taxa	
44	Glyptotendipes	45762	7.02	1 taxa	1 site
44	Dugesia tigrina	28438	4.36	1 taxa	1 sites
44	Tricorythodes	25799	3.96	1 taxa	7 sites
44	Tanytarsus	22221	3.41	1 taxa	1 site
44	Caenis	19931	3.06	1 taxa	2 sites
44	Polypedilum	18398	2.82	8 taxa	3 sites
44	Leptophlebia	16880	2.59	6 sites	
44	Baetis	14128	2.17	1 taxa	3 sites
47	Hydropsyche	54654	8.41	8 taxa	5 sites
47	Tanytarsus	41626	6.41	1 taxa	7 sites
47	Naididae	40600	6.25	7 taxa	8 sites
47	Cheumatopsyche	36933	5.68	1 taxa	8 sites
47	Baetis	32872	5.06	1 taxa	7 sites
47	Rheotanytarsus	28096	4.32	1 taxa	2 sites
47	Caecidotea	26143	4.02	1 taxa	5 sites
47	Polypedilum	25636	3.95	8 taxa	
47	Physa	20971	3.23	1 taxa	4 sites
47	Fallceon	20492	3.15	1 taxa	7 sites
47	Heptagenia	18572	2.86	2 taxa	3 sites

Table 14. continued

Ecoregion	FinalID	Number Collected at all sites	Percent	Taxa	Number of sites where taxa is predominant (> 50%)
47	Stenacron	16095	2.48	1 taxa	
47	Limnodrilus	14274	2.20	5 taxa	4 sites
47	Tricorythodes	13275	2.04	1 taxa	1 site
271	Rheotanytarsus	79347	26.84	1 taxa	1 site
271	Dero	29805	10.08	4 taxa	1 site
271	Tubificidae, immature	28453	9.63	1 taxa	1 site
271	Dicrotendipes	23102	7.82	1 taxa	1 site
271	Polypedilum	17460	5.91	9 taxa	6 sites
271	Glyptotendipes	11946	4.04	1 taxa	2 sites
271	Hydropsyche	8877	3.00	6 taxa	
271	Thienemannimyia	8576	2.90	1 taxa	1 site
271	Tanytarsus	7455	2.52	1 taxa	1 site
271	Pristina	6349	2.15	1 taxa	1 site

Table 15. The most abundant macroinvertebrate taxa collected in Nebraska during 1997-2001 Nebraska R-EMAP.

FinalID	Number Collected	Number of Taxa Collected
Rheotanytarsus	231924	1 taxa
Hydropsyche	210681	8 taxa
Tanytarsus	123719	1 taxa
Naididae	120699	9 taxa
Polypedilum	97194	10 taxa
Tricorythodes	91921	1 taxa
Baetis	91462	1 taxa
Tubificidae	79553	1 taxa
Glyptotendipes	75192	1 taxa
Dicrotendipes	69817	1 taxa
Dero	68063	6 taxa
Cheumatopsyche	64323	1 taxa
Simuliidae	59057	1 taxa
Dugesia	55838	1 taxa
Caenis	55368	1 taxa
Brachycentrus	52413	1 taxa
Heptagenia	49369	2 taxa
Isonychia	42540	1 taxa
Physa	41479	1 taxa
Fallceon	37393	1 taxa
Limnodrilus	35855	5 taxa
Stenacron	33932	2 taxa
Hyalella azteca	32609	1 taxa
Cricotopus	31101	6 taxa
Thienemannimyia	30477	1 taxa
Caecidotea	28467	1 taxa
Acentrella	24481	1 taxa
Chironomus	22919	1 taxa
Dubiraphia	20808	1 taxa
Leptophlebia	19856	1 taxa
Stenelmis	18412	1 taxa
Ceratopsyche	18173	6 taxa
Cladotanytarsus	18046	1 taxa
Rheocricotopus	17467	1 taxa
Microcylloepus	14389	1 taxa
Stenochironomus	12211	1 taxa
Argia	12119	1 taxa
Stenonema	11243	7 taxa
Pisidium	11085	1 taxa
Pristina	9571	3 taxa
Corixidae	9550	1 taxa
Pseudochironomus	8808	1 taxa

Table 15. continued

FinalID	Number Collected	Number of Taxa Collected
Musculium	8785	3 taxa
Tvetenia	8587	2 taxa
Enallagma	8087	1 taxa
Procladius	8044	1 taxa
Hetaerina	7860	1 taxa
Hexagenia	6864	2 taxa
Nectopsyche	6790	3 taxa
Helophorus	6316	1 taxa
Orthocladius	5800	2 taxa
Cryptochironomus	5555	2 taxa
Paracloeodes	5291	2 taxa
Cryptotendipes	4404	1 taxa
Tanypus	4209	1 taxa
Phaenopsectra	4193	1 taxa
Brillia	3949	1 taxa
Gomphus	3607	1 taxa
Larsia	3259	1 taxa
Ablabesmyia	3248	1 taxa
Callibaetis	2599	1 taxa
Thienemanniella	2190	1 taxa
Sphaeridium	1966	2 taxa

Table 16. Minimum, 25th percentile, median, 75th percentile, maximum, and number of samples for macroinvertebrate metrics taken during R-EMAP sampling in Nebraska, 1997-2001.

Ecoregion	Metric/Stream Type/Ecoregion	Minimum	25%tile	Median	75%tile	Maximum	Number Sampled
all	BugSc-p-all	4	12	16	22	26	146
	BugSc-r-all	8	16	22	24	28	48
25	BugSc-p-25	8	14	15	18	22	14
	BugSc-r-25	16	16	22	24	24	7
27	BugSc-p-27	6	12	16	20	24	34
	BugSc-r-27	14	16	20	23	26	8
271	BugSc-p-271	6	10	15	21	26	12
	BugSc-r-271	22	22	22	26	26	3
42	BugSc-p-42	8	8	13	18	18	2
	BugSc-r-42	16	22	26	28	28	5
43	BugSc-p-43	10	10	14	18	18	2
	BugSc-r-43	8	16	18	20	22	5
44	BugSc-p-44	10	18	22	24	28	17
	BugSc-r-44	16	22	23	26	28	6
47	BugSc-p-47	4	12	16	22	28	65
	BugSc-r-47	14	16	21	24	28	14
all	Dom01Pct-p-all	15.1	25	35.1	44.4	93	146
	Dom01Pct-r-all	12.7	26.1	32.8	40.4	61.1	48
25	Dom01Pct-p-25	15.3	26	35.5	39.4	65.4	14
	Dom01Pct-r-25	25.9	30.8	36.8	44.2	61.1	7
27	Dom01Pct-p-27	15.7	25.8	35.1	41.3	75.7	34
	Dom01Pct-r-27	14.3	20.9	33.2	38.1	86.8	8
271	Dom01Pct-p-271	18.6	27.5	37.2	48.6	57.4	12
	Dom01Pct-r-271	31	31	33.2	40.4	40.4	3
42	Dom01Pct-p-42	40.5	40.5	49.4	58.3	58.3	2
	Dom01Pct-r-42	18.6	19.9	21.5	26.5	29.9	5
43	Dom01Pct-p-43	21.4	21.4	24.1	26.7	26.7	2
	Dom01Pct-r-43	14.4	34	44.1	60.7	83.6	5
44	Dom01Pct-p-44	17.6	25	31.7	44.4	89	17
	Dom01Pct-r-44	21.6	29.1	32.5	44.5	51.5	6
47	Dom01Pct-r-47	12.7	25.6	34	38.9	53.6	14
	Dom01Pct-p-47	12.1	24.6	36.4	45.8	93	65
all	EPTTax-p-all	0	6	12	17	23	146
	EPTTax-r-all	1	13.5	16	20	29	48
25	EPTTax-p-25	3	6	10	16	20	14
	EPTTax-r-25	6	12	19	20	22	7
27	EPTTax-p-27	2	6	12	18	23	34
	EPTTax-r-27	8	10	15	16.5	22	8
271	EPTTax-p-271	3	4	9	12	24	12
	EPTTax-r-271	15	15	16	20	20	3

Table 16. continued.

Ecoregion	Metric/Stream Type/Ecoregion	Minimum	25%tile	Median	75%tile	Maximum	Number Sampled
42	EPTTax-p-42	11	11	16.5	22	22	2
	EPTTax-r-42	6	18	19	19	22	5
43	EPTTax-p-43	5	5	11	17	17	2
	EPTTax-r-43	1	11	14	16	20	5
44	EPTTax-p-44	2	12	18	19	22	17
	EPTTax-r-44	15	18	22.5	26	29	6
47	EPTTax-p-47	0	6	14	16	31	65
	EPTTax-r-47	10	14	16	19	23	14
all	HBI-p-all	2.77	5.1	5.7	6.22	8.18	146
	HBI-r-all	2.59	2.15	5.56	5.82	7.2	48
25	HBI-p-25	2.77	4.49	5.31	6	7.52	14
	HBI-r-25	5.12	5.32	5.67	5.96	6.85	7
27	HBI-p-27	3.39	5.32	5.94	6.65	7.93	34
	HBI-r-27	3.65	4.29	5.41	5.81	7.25	8
271	HBI-p-271	3.81	4.69	5.09	6.27	8.11	12
	HBI-r-271	5.47	5.47	5.65	5.8	5.8	3
42	HBI-p-42	6.39	6.39	7.09	7.78	7.78	2
	HBI-r-42	4.91	5.17	5.18	5.71	5.8	5
43	HBI-p-43	6.14	6.14	6.28	6.42	6.42	2
	HBI-r-43	2.59	5.3	5.77	5.84	7.14	5
44	HBI-p-44	3.33	4.9	5.16	5.86	7.38	17
	HBI-r-44	3.62	4.28	4.79	5.61	6.36	6
47	HBI-p-47	4.37	5.36	5.75	6.15	8.18	65
	HBI-r-47	4.71	5.19	5.59	6.25	8.01	14
all	Tottax-p-all	5	35	48.5	58	41	146
	Tottax-r-all	9	53	59.5	68	77	48
25	Tottax-p-25	14	26	36.5	44	51	14
	Tottax-r-25	32	55	66	74	74	7
27	Tottax-p-27	17	32	47.5	54	69	34
	Tottax-r-27	39	44.5	63.5	69	73	8
271	Tottax-p-271	24	34.5	45.5	58.5	73	12
	Tottax-r-271	61	61	62	78	78	3
42	Tottax-p-42	50	50	55	60	60	2
	Tottax-r-42	16	58	62	63	70	5
43	Tottax-p-43	35	35	41	47	47	2
	Tottax-r-43	9	47	57	58	68	5
44	Tottax-p-44	23	52	61	64	73	17
	Tottax-r-44	51	59	71	77	77	6
47	Tottax-p-47	5	36	49	58	89	65
	Tottax-r-47	47	51	58	61	76	14

Table 17. Pearson correlation coefficients (r) for all sites for fish index (IBI8), fish metrics, macroinvertebrate index (BugSc), macroinvertebrate metrics, and habitat index (Habitat5) and physical habitat metrics, 1997-2001 R-EMAP. Columns with asterisk (*) show significant differences (p<0.05).

Indices and Metric	Habitat HBI Pearson Correlation Coefficient	Probability (p)	*	Number	Fish IBI8 Pearson Correlation Coefficient	Probability (p)	*	Number	Macroinvertebrate ICI Pearson Correlation Coeffiecient	Probability (p)	*	Number
IBI fish index (ibi8)	0.32003	<0.0001	*	210	1.00000			210	0.20893	0.0027	*	204
Number native species (natsp)	0.13319	0.0540		210	0.83413	<0.0001	*	210	0.02731	0.6982		204
Num.native families (natfam)	0.17399	0.0115	*	210	0.77644	<0.0001	*	210	-0.02390	0.7344		204
Num. sensitive sp. (sensit)	0.32614	<0.0001	*	210	0.51482	<0.0001	*	210	0.12257	0.0807		204
% tolerant (tolrnt)	0.36627	0.3663		210	0.34764	<0.0001	*	210	0.21784	0.0017	*	204
Num. benthic sp. (benthic)	0.21151	0.2115		210	0.66234	<0.0001	*	210	0.25995	0.0002	*	204
Num long lived sp. (longlive)	0.13499	0.1350		210	0.74152	<0.0001	*	210	-0.02598	0.7122		204
% non-native (alien)	0.09590	0.1662		210	0.52568	<0.0001	*	210	0.17926	0.0103	*	204
% carnivore (carn)	0.03366	0.8606		210	0.34067	<0.0001	*	210	0.16196	0.0207	*	204
ICI macroinvertebrate index (bugsc)	0.26021	0.0002	*	204	0.20893	0.0027		204	1.00000			204
Number species (totaltax)	0.36504	<0.0001	*	204	0.28324	<0.0001	*	204	0.78676	<0.0001	*	204
Num. EPT taxa (epttax)	0.37239	<0.0001	*	204	0.27349	<0.0001	*	204	0.72038	<0.0001	*	204
Hilsenhoff Index (HBI)	0.01197	0.8651		204	-0.12298	0.0797		204	-0.24756	0.0004	*	204
Dominant %age (dom01pct)	-0.02942	0.6762		204	0.04426	0.5296		204	-0.53644	<0.0001	*	204
Habitat index (habitat5)	1.00000			210	0.32003	<0.0001	*	210	0.26021	0.0002	*	204
% riparian Veg. layer canovy + middle (xcm)	-0.11919	0.0849		210	-0.26753	<0.0001	*	210	-0.18681	0.0075	*	204
% riparian Veg. ground layer barren (xgb)	-0.45385	<0.0001	*	210	-0.23195	0.0007	*	210	-0.13413	0.0558		204
% row crop (w1h_crop)	-0.61412	<0.0001	*	210	-0.33733	<0.0001	*	210	-0.16611	0.0176	*	204
% overhanging veg (pfc_ohv)	0.55537	<0.0001	*	210	0.19548	0.0045	*	210	0.16484	0.0185	*	204
% undercut banks (pfc_ucb)	0.47574	<0.0001	*	210	0.16945	0.0139	*	210	0.23122	0.0009	*	204
% substrate sand (pct_sa)	0.27149	<0.0001	*	210	0.18121	0.0085	*	210	0.21064	0.0025	*	204
% substrate fines (pct_fn)	-0.44183	<0.0001	*	210	-0.17628	0.0105	*	210	-0.31543	<0.0001	*	204

Table 17. continued.

Indices and Metric	Habitat HBI Pearson Correlation Coefficient	Probability (p)	*	Number	Fish IBI8 Pearson Correlation Coefficient	Probability (p)	*	Number	Macroinvertebrate ICI Pearson Correlation Coeffiecient	Probability (p)	*	Number
% glide (pct_gl)	-0.39463	<0.0001	*	210	-0.20387	0.0030	*	210	-0.22352	0.0013	*	204
% pool (pct_pl)	0.20546	0.0028	*	210	0.15649	0.0233	*	210	0.19530	0.0051	*	204
% riffles (pct_ri)	0.47562	<0.0001	*	210	0.16063	0.0199	*	210	0.22779	0.0011	*	204
% pasture/hayfield (w1h_pstr)	0.44199	<0.0001	*	210	0.28211	<0.0001	*	210	0.12430	0.0765		204
% substrate hardpan (pct_hp)	-0.19448	0.0047	*	210	-0.30612	<0.0001	*	210	-0.10680	0.1284		204
Incision-width ratio (inciswid)	-0.50248	<0.0001	*	210	-0.21354	0.0019	*	210	-0.02895	0.6810		204
% areal fish cover aq. veg. (xfc_aqm)	0.31612	<0.0001	*	210	0.11732	0.0899		210	0.07678	0.2751		204
% areal fish cover large wood debris (xfc_lwd)	-0.14903	0.0309	*	210	-0.08776	0.2053		210	-0.14064	0.0448	*	204

Table 18. Minimum percentiles, median, and maximum scoring ranges for Nebraska statewide habitat metrics from Nebraska R-EMAP 1997-2001.

Periennial Streams							
Metric	**Metric Name**	**Minimum**	**25%tile**	**Median**	**75%tile**	**Maximum**	**Number**
Habitat Score	Habscore5-p-all*	20	28	32	38	54	157
Incision/Width Ratio	inciswid-p-all	0.001	0.09	0.28	0.46	1.3	157
% sand substrate	pct_SA-p-all	0	0	27.2	96.3	100	157
% rowcrop	w1h_crop-p-all	0	0	0.34	0.66	1	157
% riffle	pct_RI-p-all	0	0	0	0	100	157
% undercut bank	xfc_ucb-p-all	0	0	0	0.004	0.15	157
% overhanging veg	pfc_ohv-p-all	0	0.18	0.72	0.9	1	157
% silt substrate	pct_FN-p-all	0	0	10.9	72.7	100	157
Portion Middle canopy	xcm-p-all	0.25	0.17	0.3	0.44	1.16	157
% pool	pct_PL-p-all	0	0	0	5	37	157
% barren banks	xgb-p-all	0	0.05	0.13	0.26	0.84	157
Reference Streams							
Metric	**Metric Name**	**Minimum**	**25%tile**	**Median**	**75%tile**	**Maximum**	**Number**
Habitat Score	Habscore5-r-all	26	38	46	48	52	55
Incision/Width Ratio	inciswid-r-all	0.003	0.07	0.16	0.38	0.79	55
% sand substrate	pct_SA-r-all	0	5.4	49	96.3	100	55
% rowcrop	w1h_crop-r-all	0	0	0	0.33	0.69	
% riffle	pct_RI-r-all	0	0	12	64.6	100	55
% undercut bank	xfc_ucb-r-all	0	0	0.01	0.04	0.27	55
% overhanging veg	pfc_ohv-r-all	0	0.81	1	1	1	55
% silt substrate	pct_FN-r-all	0	0	0	27.2	100	55
Portion Middle canopy	xcm-r-all	0.06	0.17	0.26	0.37	0.59	55
% pool	pct_PL-r-all	0	0	0	12	50.6	55
% barren banks	xgb-r-all	0	0.03	0.08	0.18	0.29	55

* p - randomly selected perennial streams; r - reference stream

Table 19. Minimum, percentiles, median, and maximum scoring ranges for the Nebraska Habitat Index by ecoregions for statewide metrics from R-EMAO, 1997-2001.

Perennial Streams							
ecoregion	**Metric**	**Minimum**	**25%tile**	**Median**	**75%tile**	**Maximum**	**Number**
all	Habsc5-p-all**	20	28	32	38	54	157
25*	Habsc5-p-25	26	34	36	40	52	16
27	Habsc5-p-27	20	30	35	40	48	36
42	Habsc5-p-42	48	48	50	52	52	2
43	Habsc5-p-43	32	32	38	44	44	2
44	Habsc5-p-44	28	36	42	46	54	17
47	Habsc5-p-47	22	28	30	34	52	70
271	Habsc5-p-271	26	28	31	36	40	14
Reference Streams							
ecoregion	**Metric**	**Minimum**	**25%tile**	**Median**	**75%tile**	**Maximum**	**Number**
all	Habsc5-r-all	26	38	46	48	56	55
25	Habsc5-r-25	48	48	48	50	56	7
27	Habsc5-r-27	42	46	48	48	50	9
42	Habsc5-r-42	44	46	48	48	52	5
43	Habsc5-r-43	36	44	48	48	52	5
44	Habsc5-r-44	42	46	48	50	52	8
47	Habsc5-r-47	26	36	38	44	48	17
271	Habsc5-r-271	44	45	47	48	48	4

*Ecoregions: 25-Western High Plains, 27--Western Central Great Plains, 271—Eastern Central Great Plains, 42--Northwestern Glaciated Plains, 43--Northwestern Great Plains, 44--Nebraska Sand Hills, 47--Western Corn Belt Plains.
**NHI Score; p-periennial streams, r-reference streams; ecoregion

Table 20. Significant differences using Duncan's Multiple Range Analysis of Variance Test ($p<0.05$) between metrics used in the NHI (Nebraska Habitat Index) and ecoregions for rerference streams and randomly selected perennial streams in Nebraska, R-EMAP, 1997-2001. Metrics not on list show no significant difference. Overlapping lines indicate a similiarity between ecoregions and nonoverlapping lines indicate a difference between ecoregions.

Metrics	Ecoregions
Perennial Streams	
Incision/Width Ratio	47 271 27 43 25 44 42
Percent Sand Substrate	44 42 27 25 47 271 43
Percent Rowcrop	47 271 27 25 43 42 44
Percent Riffle	42 43 44 27 47 271 25
Percent Overhanging Vegetation	43 44 42 25 27 47 271
Percent Silt Substrate	43 271 27 47 25 44 42
Middle Canopy Layer Along Stream Bank	42 47 27 25 271 44 43
Percent Barren Banks	271 25 47 27 43 44 42
Incision/Width Ratio Score	44 42 25 27 43 271 47
Percent Sand Substrate Score	43 271 47 25 27 42 44
Percent Rowcrop Score	42 44 43 25 27 271 47
Percent Riffle Score	42 43 44 47 27 25 271
Percent Overhanging Vegetation Score	43 44 42 27 25 47 271
Percent Silt Substrate Score	42 44 25 47 27 271 43

Table 20. continued.

Metrics	Ecoregions
Middle Canopy Layer Along Stream Bank Score	42 47 27 25 271 44 43
Percent Barren Banks Score	42 44 25 43 27 47 271
Habitat5 Index Score	42 44 43 25 27 271 47
Reference Streams	
Incision/Width Ratio	47 43 271 27 44 25 42
Percent Sand Substrate	44 42 27 43 47 25 271
Percent Rowcrop	47 27 42 271 44 43 25
Percent Riffle	44 42 43 271 25 47 27
Percent Overhanging Vegetation	25 44 27 43 42 271 47
Percent Silt Substrate	25 47 43 271 27 44 42
Middle Canopy Layer Along Stream Bank	47 27 271 42 25 43 44
Percent Barren Banks	271 43 47 44 42 25 27
Incision/Width Ratio Score	42 44 25 27 43 271 47
Percent Sand Substrate Score	271 25 47 43 27 44 42
Percent Rowcrop Score	25 43 44 42 271 27 47
Percent Riffle Score	44 42 43 271 25 47 27

Table 20. continued.

Metrics	Ecoregions
Percent Undercut Bank Score	27 25 44 47 43 271 42
Percent Overhanging Vegetation Score	25 44 27 43 42 47 271
Percent Silt Substrate Score	44 42 271 47 27 43 25
Middle Canopy Layer Along Stream Bank Score	27 42 271 47 43 25 44
Percent Barren Banks Score	25 27 44 42 47 271 43
Habitat5 Index Score	25 44 42 27 271 43 47

Table 21. Summary statistics for water chemistry parameters collected from all perennial and reference streams in Nebraska, 1997-2001 R-EMAP.

Stream Type / Chemical Indicator	Code	Minimum	25%tile	Median	75%tile	Maximum	Mean	Number sampled	Std.Dev.	Variance	Std. Error
Perennial Stream											
Alachlor, ug/L, Wp27	REMAP_W_010	0.05	0.05	0.02	0.2	2.8	0.49	153	0.924	0.855	0.074
Alkalinity, Carbonate, ug/L	ALK_CARB_013	86.6	205	278	338	413	265.6	36	95.724	9163.099	15.954
Ammonia, mg/L, Wt01	AMMONIA_018	0.058	0.064	0.1	0.239	5.1	0.284	157	0.591	0.349	0.047
Arsenic, W, ug/L, Wm03	ARSEN_W_030	2	5.06	7.33	13.2	29.4	9.79	121	6.415	41.158	0.583
Atrazine, ug/L, Wp31	REMAP_W_031	0.2	0.02	2.8	3	4.4	1.88	151	1.364	1.862	0.111
Barium, ug/L Wm04	REMAM_W_032	35.2	125.5	167.5	207.5	526	168.8	156	72.517	5258.818	5.806
Cadmium, ug/L, Wm28	CADMIU_W_073	1	1	1	1	1.57	1	70	0.068	0.004	0.004
Calcium, ug/L, Wm21	REMAM_W_074	16.1	53.1	72.3	94.9	173	74.1	157	31.911	1018.372	2.546
Chlordane, tech., ug/L, Wp24	REMAP_W_080	0.02	0.2	0.2	0.2	0.292	0.17	155	0.062	0.003	0.005
Chloride, ug/L	CHLORIDE_082	0.36	7.1	13.3	27.8	111	24.8	70	28.964	838.951	3.461
Chlorpyrifos, ug/L, Wq02	REMAP_W_096	0.01	0.01	0.05	0.05	0.3	0.067	155	0.094	0.008	0.007
Chromium, ug/L, Wm08	REMAM_W_098	3.69	3.69	15	15	282	12.95	157	22.292	496.963	1.779
Conductivity, umhos/cm, Wg16	REMAP_FP_103	83	407.5	559.5	679	4250	580.1	156	388.611	151019.3	31.113
Copper, ug/L, Wm09	REMAM_W_104	1.54	4.06	5	5	23.5	5.02	157	2.584	6.68	0.206
Diazinon, ug/L, Wc33	REMAP_W_118	0.03	0.07	0.07	0.4	0.5	0.192	154	0.185	0.034	0.014
Dissolved Oxygen, mg/L, Wg17	REMAP_FP_164	0.42	6.6	7.6	8.55	14.7	7.68	156	2.177	4.739	0.174
Flow, CFS, Wf04	REMAP_FP_177	0	0.8	5.95	25.5	1380	61.9	154	181.639	32992.94	14.636
Hardness, calc., mg/L, Wg31	HARD_CAL_194	51.5	193	261	332	739	265.8	157	121.104	14666.37	9.665
Lead,ug/L, Wm30	LEAD_W_215	0.557	1.42	2.65	4.38	55.6	3.91	157	5.275	27.826	0.421
Magnesium, ug/L, Wm22	REMAM_W_216	2.19	13	19	24.1	74.5	19.77	157	11.683	136.5	0.932
Mercury, ug/L, Wm34	MERCU_W_218	0.1	0.1	0.1	0.13	0.818	0.132	155	0.069	0.004	0.005
Metolachlor, ug/L, Wp43	REMAP_W_244	0.05	0.05	0.16	0.5	5.4	0.654	141	1.058	1.119	0.089
Nickel, ug/L, Wm13	REMAM_W_249	6.23	6.23	20	20	22.8	14.84	157	6.465	41.804	0.516
Nitrate + Nitrite, mg/L, Wt02	NO3NO2_W_250	0.029	0.389	1.13	3.04	410	6.8	87	43.809	1919.242	4.696
Nitrogen, organic, calc., mg/L	N_ORG_257	0.075	0.445	0.67	1.05	3.54	0.804	157	0.593	0.351	0.047
Nitrogen, total, calc., mg/L, Wg11	N_T_CALC_258	0.075	1.17	2.32	4.09	410	5.65	157	32.581	1061.534	2.6
Nitrogen, total, kjeldhal, mg/L, Wt03	N_TK_W_259	0.075	0.345	0.77	1.32	6.01	0.926	121	0.862	0.743	0.078
pH, SU, Wf05	REMAP_FP_284	6.5	7.8	8.1	8.3	9.7	8.04	155	0.419	0.176	0.033

Table 21. continued

Stream Type / Chemical Indicator	Code	Minimum	25%tile	Median	75%tile	Maximum	Mean	Number sampled	Std.Dev.	Variance	Std. Error
Phosphorus, total, mg/L,Wt04	P_T_W_289	0.024	0.11	0.215	0.365	2.29	0.313	121	0.344	0.118	0.031
Potassium, ug/L	REMAM_W_293	1.59	5.2	7.58	10.9	26	8.5	106	4.433	19.655	0.43
Propachlor, ug/L, Wp28	REMAP_W_296	0.04	0.04	0.1	0.2	0.292	0.119	155	0.076	0.005	0.006
Selenium, ukg/L. Wm32	SELEN_W_306	1.81	1.81	2	3.41	29	4.04	157	4.535	20.568	0.361
Silver, ug/L, Wm01	REMAP_W_307	7.24	25	25	25	25	22.82	106	5.853	34.262	0.568
Sodium, ug/L	REMAM_W_309	8.71	17.7	25.85	63.9	741	49.4	106	78.822	6213.063	7.655
Sulfates, ug/L	SO4_W_316	2	31.3	72.6	204	730	154.47	70	186.215	34676.2	22.257
Temperature, Deg C, Wf01	REMAP_FP_319	12.3	20.4	23	26.9	36.6	23.6	156	4.791	22.958	0.383
Trifluralin, ug/L, Wp32	REMAP_W_349	0.01	0.01	0.03	0.03	0.25	0.051	155	0.079	0.006	0.006
Turbidity, NTU, Wg30	TURB_NTU_354	0.315	3.1	8	17.6	185	16.36	119	24.07	579.371	2.206
Zinc, ug/L, Wm20	REMAM_W_361	4.07	10.5	25	25	191	25.54	157	26.672	711.434	2.128
Alkalinity, Bicarbonate, ug/L	ALK_BICA_012	74.2	143	184.5	212	336	178.05	34	55.042	3029.712	9.439
Alkalinity, Carbonate, ug/L	ALK_CARB_013	86.6	205	278	338	413	265.63	36	95.724	9163.1	15.954
Arsenic, dissolved, ug/L	ARSEN_WD_030	1.8	4.33	6.13	8.62	40.5	6.93	106	4.818	23.219	0.468
Barium, dissolved, ug/L	REMAM_WD_032	47.6	102	138	173	334	142.17	105	58.527	3425.419	5.711
Cadmium, dissolved, ug/L	CADMI_WD_073	1	1	1	1	1	1	106	0	0	0
Calcium, dissolved, ug/L	REMAM_WD_074	17.7	58.7	76.1	94.4	143	79.96	105	28.468	810.468	2.778
Chromium, dissolved, ug/L	REMAM_WD_098	3.7	4	4	4	17.6	5.31	105	3.711	13.777	0.362
Copper, dissolved, ug/L	REMAM_WD_104	1.5	2	2	2	5	2.21	105	0.991	0.983	0.096
Iron, dissolved, ug/L	REMAM_WD_209	29	29	29	29	309	41.2	105	47.325	2239.663	4.618
Lead, dissolved, ug/L	LEAD_WD_215	1	1	1	1.09	145	3.96	106	19.664	386.692	1.909
Magnesium, dissolved, ug/L	REMAM_WD_216	2.91	16.1	20	24.2	64.4	21.69	105	11.68	136.439	1.139
Manganese, dissolved, ug/L	REMAM_WD_217	2	15.7	63	169	3310	171.8	105	381.123	145255.2	37.193
Mercury, dissolved, ug/L	MERCU_WD_218	0.1	0.1	0.1	0.2	0.2	0.147	69	0.05	0.002	0.006
Nickol, dissolved, ug/L	REMAM_WD_249	6	6	6	6.2	20	7.78	105	4.556	20.762	0.444
Selenium, dissolved, ug/l	SELEN_WD_306	1.81	1.81	2.63	7.59	38.3	6.47	106	7.556	57.096	0.733
Zinc, dissolved, ug/l	REMAM_WD_261	4	4	4	4.85	194	11.14	105	28.051	786.877	2.737
Reference Stream											
Alachlor, ug/L, Wp27	REMAP_W_010	0.05	0.05	0.2	2.8	2.8	1.18	55	1.329	1.767	0.179
Alkalinity, Carbonate, ug/L	ALK_CARB_013	175	263	336	338	360	292.1	9	69.982	4897.611	23.327

Table 21. continued

Stream Type / Chemical Indicator	Code	Minimum	25%tile	Median	75%tile	Maximum	Mean	Number sampled	Std.Dev.	Variance	Std. Error
Ammonia, mg/L, Wt01	AMMONIA_018	0.058	0.059	0.12	0.227	0.68	0.205	55	0.207	0.042	0.027
Arsenic, W, ug/L, Wm03	ARSEN_W_030	2.47	7.14	12.9	19.2	25.8	13.29	48	6.259	39.176	0.903
Atrazine, ug/L, Wp31	REMAP_W_031	0.2	0.2	2.8	3	3	1.96	55	1.274	1.623	0.171
Barium, ug/L Wm04	REMAM_W_032	65.1	120	162	189	254	157.1	55	46.609	2172.48	6.284
Cadmium, ug/L, Wm28	CADMIU_W_073	1	1	1	1	1	1	14	0	0	0
Calcium, ug/L, Wm21	REMAM_W_074	13.6	31.5	53.9	76.7	176	58.06	55	29.1	851.482	3.934
Chlordane, tech., ug/L, Wp24	REMAP_W_080	0.02	0.02	0.2	0.2	0.2	0.128	55	0.088	0.007	0.012
Chloride, ug/L	CHLORIDE_082	0.36	4	6.85	14.6	140	17.74	14	35.693	1274.044	9.539
Chlorpyrifos, ug/L, Wq02	REMAP_W_096	0.01	0.01	0.05	0.3	0.3	0.136	55	0.135	0.018	0.018
Chromium, ug/L, Wm08	REMAM_W_098	3.69	3.69	14.2	15	184	13.4	55	24.001	576.082	3.236
Conductivity, umhos/cm, Wg16	REMAP_FP_103	94	242	400	521	889	403.7	55	181.172	32823.37	24.429
Copper, ug/L, Wm09	REMAM_W_104	1.54	3.39	5	8.32	8.32	5.12	55	2.411	5.814	0.325
Diazinon, ug/L, Wc33	REMAP_W_118	0.03	0.07	0.07	0.5	0.5	0.21	55	0.216	0.046	0.029
Dissolved Oxygen, mg/L, Wg17	REMAP_FP_164	3.03	7	7.8	8.4	11.9	7.67	55	1.631	2.663	0.22
Flow, CFS, Wf04	REMAP_FP_177	0.1	1.4	4.4	30.7	686	58.8	55	142.417	20282.64	19.38
Hardness, calc., mg/L, Wg31	HARD_CAL_194	43.1	102	185	254	550	195.2	55	101.42	10286.14	13.675
Lead,ug/L, Wm30	LEAD_W_215	0.45	1	2.19	3.86	13.5	3.16	55	2.966	8.799	0.399
Magnesium, ug/L, Wm22	REMAM_W_216	2.22	5.45	10.5	18.3	30.3	12.2	55	7.696	59.233	1.037
Mercury, ug/L, Wm34	MERCU_W_218	0.1	0.1	0.127	0.127	0.2	0.122	53	0.028	0.0008	0.003
Metolachlor, ug/L, Wp43	REMAP_W_244	0.05	0.05	0.5	2.9	2.9	1.46	47	1.37	1.877	0.199
Nickel, ug/L, Wm13	REMAM_W_249	6.23	6.23	11.5	20	20	11.9	55	5.668	32.137	0.764
Nitrate + Nitrite, mg/L, Wt02	NO3NO2_W_250	0.03	0.45	1.41	2.86	529	24.45	41	102.13	10430.57	15.95
Nitrogen, organic, calc., mg/L	N_ORG_257	0.075	0.287	0.547	0.924	1.64	0.625	55	0.423	0.179	0.057
Nitrogen, total, calc., mg/L, Wg11	N_T_CALC_258	0.075	1.03	2.25	4.13	529	19.77	55	88.36	7807.565	11.914
Nitrogen, total, kjeldhal, mg/L, Wt03	N_TK_W_259	0.075	0.498	0.788	1.09	2.01	0.807	48	0.435	0.189	0.062
pH, SU, Wf05	REMAP_FP_284	7.3	7.8	8.1	8.3	8.9	8.06	55	0.32	0.102	0.043
Phosphorus, total, mg/L,Wt04	P_T_W_289	0.024	0.108	0.181	0.274	1.29	0.22	48	0.195	0.038	0.028
Potassium, ug/L	REMAM_W_293	2.08	3.1	5.82	8.54	29.2	6.75	21	5.878	34.553	1.282
Propachlor, ug/L, Wp28	REMAP_W_296	0.04	0.04	0.1	0.2	0.2	0.104	55	0.061	0.003	0.008
Selenium, ukg/L. Wm32	SELEN_W_306	1.81	1.81	1.81	2	10.7	2.66	55	2.237	5.006	0.0301
Silver, ug/L, Wm01	REMAP_W_307	7.24	7.24	7.24	7.88	7.88	7.54	34	0.324	0.105	0.055

Table 21. continued

Stream Type / Chemical Indicator	Code	Minimum	25%tile	Median	75%tile	Maximum	Mean	Number sampled	Std.Dev.	Variance	Std. Error
Sodium, ug/L	REMAM_W_309	6.72	14.5	22.4	27.4	135	27.4	21	26.914	724.412	5.873
Sulfates, ug/L	SO4_W_316	4.5	13.4	33.8	108	292	77.9	14	92.135	8488.937	24.624
Temperature, Deg C, Wf01	REMAP_FP_319	13.9	19	23.2	25.9	33	22.6	55	4.55	20.708	0.613
Trifluralin, ug/L, Wp32	REMAP_W_349	0.01	0.01	0.03	0.25	0.25	0.111	55	0.114	0.013	0.015
Turbidity, NTU, Wg30	TURB_NTU_354	0.3	3.3	6.17	13	99.7	10.6	46	15.429	238.077	2.274
Zinc, ug/L, Wm20	REMAM_W_361	4.07	4.07	25	34.9	75.6	23.4	55	18.188	330.819	2.452
Alkalinity, Bicarbonate, ug/L	ALK_BICA_012	96.8	163	203	209	290	192.3	5	70.564	4979.348	31.557
Alkalinity, Carbonate, ug/L	ALK_CARB_013	175	263	336	338	360	292.1	9	69.982	4897.611	23.327
Arsenic, dissolved, ug/L	ARSEN_WD_030	2.23	3.2	5.73	7.72	10.6	5.89	21	2.778	7.721	0.606
Barium, dissolved, ug/L	REMAM_WD_032	67.6	117	147	182	218	146.1	21	46.55	2166.956	10.158
Cadmium, dissolved, ug/L	CADMI_WD_073	1	1	1	1	1	1	21	0	0	0
Calcium, dissolved, ug/L	REMAM_WD_074	30.9	51.9	69	94.2	168	76.6	21	31.699	1004.832	6.917
Chromium, dissolved, ug/L	REMAM_WD_098	3.7	3.7	4	4	4	3.9	21	0.144	0.021	0.031
Copper, dissolved, ug/L	REMAM_WD_104	1.5	1.5	2	2	2.19	1.84	21	0.251	0.063	0.054
Iron, dissolved, ug/L	REMAM_WD_209	29	29	29	29	37.8	29.4	21	1.92	3.687	0.419
Lead, dissolved, ug/L	LEAD_WD_215	1	1	1	1	4.37	1.26	21	0.774	0.599	0.168
Magnesium, dissolved, ug/L	REMAM_WD_216	3.42	13.1	18.4	24.8	28.9	17.9	21	7.341	53.903	1.602
Manganese, dissolved, ug/L	REMAM_WD_217	3.04	12.5	39	99.2	320	69.5	21	77.416	5993.315	16.893
Mercury, dissolved, ug/L	MERCU_WD_218	0.1	0.1	0.1	0.2	0.2	0.13	14	0.049	0.002	0.013
Nickol, dissolved, ug/L	REMAM_WD_249	6	6	6	6.2	6.2	6.06	21	0.096	0.009	0.021
Selenium, dissolved, ug/l	SELEN_WD_306	1.81	1.81	2	6.59	14.2	4.64	21	4.286	18.372	0.935
Zinc, dissolved, ug/l	REMAM_WD_261	4	4	4	4.39	9.17	4.74	21	1.596	2.549	0.348

Table 22. Summary of Nebraska water quality standards (NDEQ 2002)

Indicator	Aquatic Life Use Classification	Condition	Acute Criteria (μg/l)	Chronic Criteria (μg/l)	Effective Dates
Ammonia	All classes	Varies with class, pH, and temperature,			
Chloride				860	
Conductivity	Ag Use Only			2000	Apr 1-Sep 30
Dissolved oxygen	CA	1 day minimum w/ Salmonid early life stages		8.0	Oct 1-May 31
		1 day minimum with other species		4.0	Jun 1-Sept30
		7 day mean w/ Salmonid early life stages		9.5	Oct 1-May 31
		7 day mean w/ other species		5.0	Jun 1-May 31
		30 day mean		6.5	Jun 1-Sep 30
	CB	1 day minimum w/ fish early life stages		5.0	Apr 1-June 30
		1 day minimum w/ other species		4.0	Jul 1-Mar 31
		7 day mean w/ fish early life stages		6.5	Apr 1-Jun 30
		7 day mean		5.0	Jul 1-Mar 30
		30 day mean		6.5	Jul 1-Mar 30
	WA	1 day minimum w/ fish early life stages		5.0	Apr 1-Sep 30
		1day minimum w/ other species		3.0	Oct 1-Mar 31
		7 day mean wi/ fish early life stage		4.0	Oct 1-Mar 31
		30 day mean		5.5	Oct 1-Mar 31
	WB	1 day minimum w/ fish early life stages		5.0	Apr 1-Sep 30

Table 22. continued

Indicator	Aquatic Life Use Classification	Condition	Acute Criteria (µg/l)	Chronic Criteria (µg/l)	Effective Dates
		1 day minimum w/ other species		5.0	Apr 1-Sep 30
		1 day minimum w/ other species		3.0	Oct 1-Mar 31
		7 day mean w/ fish early life stages		6.0	Apr 1-Sep 30
		7 day mean		4.0	Oct 1-Mar 30
		30 day mean		5.5	Oct 1-Mar 30
pH				6.5-9	
Water Temperature	CA , CB			72 F (22.2 C)	
	WA, WB			90 F (32.2 C)	
Metals					
Arsenic			750	87	
Cadmium	All classes	Varies with hardness			
Chromium III	All classes	Varies with hardness			
Chromium IV	All classes		16	11	
Copper		Varies with hardness			
Cyanide	CA		16	11	
	CB		22	5.2	
	WA, WB		41.3	9.8	
Iron	All classes			1000	
Lead	All classes	Varies with hardness			
Manganese	All classes	Varies with hardness		1000	
Mercury	All classes		1.4	0.051	
Nickel	All classes	Varies with hardness			
Selenium	All classes		20	5	
Silver	All classes	Varies with hardness			
Zinc	All classes	Varies with hardness			
Pesticides					
Alachlor	All classes		760	76	
Aldrin	All classes		3.0	0.00136	
Atrazine	All classes		330	12	
Chlordane	All classes		2.4	0.0043	
Chlorpyrifos	All classes		0.083	0.041	
DDT	All classes		1.1	0.001	
DDE	All classes		1050	.00059	

Table 22. continued

Indicator	Aquatic Life Use Classification	Condition	Acute Criteria (µg/l)	Chronic Criteria (µg/l)	Effective Dates
DDD	All classes		0.6	.0084	
Dieldrin	All classes		0.24	0.00144	
Endrin	All classes		0.086	0.036	
Heptachlor	All classes		0.52	0.00214	
Heptachlor epoxide	All classes		0.52	0.0011	
Lindane	All classes		0.95	0.16	
Metolachlor	All classes		390	100	
Propachlor	All classes			8	

Table 23. Stations over chronic standard values for ammonia and dissolved oxygen in water, 1997-2001 R-EMAP.

Ammonia

Chemical	NDEQID	STORET	Stream Name	Ecoregn	AqLifeUse	Stream Type	TEMP °C (enter)	pH (enter)	New Acute Total	New Chronic Total	AMMONIA_018 Value at site	Above Chronic Total Certeria
Ammonia	BB2101	009910	TURKEY CREEK (B)	27	1WB	PER4	24.2	7.65	15.701	1.972	4.49	***
Ammonia	EL3105	010189	DRY CREEK	47	WB	PER4	26.3	7.4	22.972	2.471	5.15	***
		WWAElkhorn special use										
Ammonia	EL4111	010192	ELKHORN RIVER (D)	47	WA	REF4	26.4	8.7	2.2045006	0.4062032	0.68	***
		WWASalt Cr special use										
Ammonia	LP2062	010089	SALT CREEK	47	WB	PER4	27	8.1	6.948	1.095	1.46	***

Dissolved oxygen (DO)

Chemical	NDEQ_ID	STORET	STRMNAME	ECOREG	STR_CLAS	FieldRef4	DO Chronic limit minimum	REMAP_FP_164-DO	Above Chronic Total Certeria
DO	BB1120	009901	CUB CREEK	27	1WA	PER4	5	4.7	***
DO	LB1002	009900	COON CREEK	27	1WA	PER4	5	0.42	***
DO	LB2105	009908	SPRING CREEK (LB)	27	1WA	PER4	5	3.5	***
DO	LB2115	009814	ROCK CREEK	27	1WA	REF4	5	3.03	***
DO	LB2115	009814	ROCK CREEK	27	1WA	REF4	5	3.03	***
DO	LP2164	010093	UNNAMED TRIB. COTTONWOOD CREEK	47	WB	PER4	5	4.1	***
DO	NI3415	009985	UNNAMED TRIB. NIOBRARA RIVER	43	WB	PER4	5	4.7	***
DO	RE2160	009554	BEAVER CREEK (A)	27	WB	PER4	5	0.5	***
DO	SP2040	010173	LODGEPOLE CREEK	25	WB	PER4	5	4.2	***

Table 24. Stations over chronic standard values for chromium, copper, lead, nickel, and zinc, 1997-2001 R-EMAP.

Chemical Constituent	NDEQID	STORET	Stream Name	Ecoregn	AqLifeUse	Stream Type	Hardness (mg/l)	Acute Value	Chronic Value	Collected Value	Over Nebr Standard
Coldwater-A streams											
Copper	NI3410	009715	SHORT PINE CREEK	43	CA	REF4	82.7	11.24	7.61	8.32	***
Coldwater-B streams											
Chromium III	RE3185	009818	FRENCHMAN CREEK (B)	25	CB	REF4	185	942.99252	122.66395	184	***
Copper	LO2085	009811	NORTH LOUP RIVER (B)	44	CB	PER4	57.2	7.9394269	5.5564439	8.32	***
Copper	LO2135	009816	CALAMUS RIVER	44	CB	PER4	56.9	7.9001874	5.5315323	23.5	***
Copper	NI4305	009596	PINE CREEK	44	CB	PER4	51.5	7.1917633	5.0797379	8.32	***
Copper	NP2104	009730	BLUE CREEK	44	CB	PER4	53.8	7.4939997	5.2729722	5.55	***
Copper	LO2145	009576	BIG CREEK	44	CB	REF4	43.1	6.0810013	4.3627754	8.32	***
Copper	NI3420	010013	PLUM CREEK	43	CB	REF4	78.4	10.685509	7.2743652	8.32	***
Lead	LO3171	009562	MIDDLE LOUP RIVER (A)	44	CB	PER4	73.7	46.253647	1.8024382	5.04	***
Lead	NI3395	009723	GORDON CREEK	44	CB	PER4	68.5	42.677704	1.6630888	3.11	***
Lead	NI3425	010014	WILLOW CREEK	44	CB	PER4	88.5	56.523813	2.2026518	2.5	***
Lead	NI4305	009596	PINE CREEK	44	CB	PER4	51.5	31.140391	1.2134963	3.93	***
Lead	NP2106	010158	BLUE CREEK	44	CB	PER4	58.1	35.588303	1.3868251	2.97	***
Lead	NP2109	010161	UNNAMED TRIB. CEDAR CREEK	25	CB	PER4	158	105.86892	4.1255598	5.05	***
Lead	LO2140	009720	GOOSE CREEK	44	CB	REF4	89	56.872867	2.216254	12.9	***
Lead	NI2380	009717	N. BRANCH VERDIGRE CREEK	42	CB	REF4	98.5	63.52711	2.4755603	3.77	***
Lead	NI3405	009582	LONG PINE CREEK	43	CB	REF4	81.3	51.511832	2.0073421	6.63	***
Lead	NI3420	010013	PLUM CREEK	43	CB	REF4	78.4	49.501254	1.9289928	3.1	***
Lead	NP2108	010160	RUSH CREEK	25	CB	REF4	140	92.969262	3.6228787	4.29	***
Lead	RE3094	009924	FRENCHMAN CREEK (A)	27	CB	REF4	218	149.16223	5.8126379	13.5	***
Lead	RE3185	009818	FRENCHMAN CREEK (B)	25	CB	REF4	185	125.30881	4.8831043	8.95	***
Lead	WH2070	009707	WARBONNET CREEK	43	CB	REF4	172	115.93766	4.517924	8.73	***
Warmwater-A streams											
Copper	NI3391	010015	NIOBRARA RIVER (D)	44	WA	REF4	88.8	12.02	8.09	8.32	***
Lead	EL3106	010190	NORTH FORK ELKHORN RIVER	47	WA	PER4	213	145.54358	5.6716242	55.6	***
Lead	EL4013	010194	SOUTH FORK ELKHORN RIVER	44	WA	PER4	78.5	49.570501	1.9316913	2.89	***
Lead	EL4110	009726	ELKHORN RIVER (C)	44	WA	PER4	105	68.102074	2.6538401	3.65	***
Lead	EL4112	010193	HOLT CREEK	44	WA	PER4	63	38.917292	1.516551	1.76	***
Lead	LO4175	009981	SOUTH LOUP RIVER	27	WA	PER4	134	88.683473	3.4558676	6.22	***
Lead	MP2052	010177	PLATTE RIVER (Issac Walton)	27	WA	PER4	261	180.31681	7.0266873	21.6	***
Lead	MP2053	010178	PLATTE RIVER	27	WA	PER4	221	151.334	5.8972686	7.09	***

Table 24. continued

Chemical Constituent	NDEQID	STORET	Stream Name	Ecoregn	AqLifeUse	Stream Type	Hardness (mg/l)	Acute Value	Chronic Value	Collected Value	Over Nebr Standard
Lead	RE2153	009919	REPUBLICAN RIVER (D)	27	WA	PER4	244	167.99496	6.5465225	9.17	***
Lead	WH1065	009567	WHITE RIVER	43	WA	PER4	183	123.86593	4.8268774	16.4	***
Lead	LB2080	009905	LITTLE BLUE RIVER (B)	271	WA	REF4	172	115.93766	4.517924	8.92	***
Lead	NI2390	009983	NIOBRARA RIVER (E)	42	WA	REF4	137	90.825383	3.5393348	5.83	***
Lead	NI4393	009742	NIOBRARA RIVER (B)	44	WA	REF4	136	90.111189	3.5115037	4.77	***
Lead	RE3113	009925	REPUBLICAN RIVER (F)	25	WA	REF4	225	154.23029	6.010133	6.2	***
Warmwater-B streams											
Chromium III	LO4180	009982	MUD CREEK	27	WB	PER4	294	1432.0163	186.42499	282	***
Copper	NI2365	009566	UNNAMED TRIB. MERRIMAN CREEK	47	WB	REF4	87	11.786522	7.9509903	8.32	***
Lead	BB2101	009910	TURKEY CREEK (B)	271	WB	PER4	176	118.8191	4.6302097	6.26	***
Lead	LB2091	009713	BIG SANDY CREEK (B)	271	WB	PER4	118	77.297515	3.0121732	10.3	***
Lead	LO4180	009982	MUD CREEK	27	WB	PER4	294	204.23607	7.9587865	9.05	***
Lead	LP2162	010091	SAND CREEK	47	WB	PER4	278	192.63994	7.5069019	8.1	***
Lead	LP2169	010098	HICKMAN BRANCH	47	WB	PER4	234	160.74911	6.2641619	6.62	***
Lead	MP2061	010152	PAWNEE CREEK	27	WB	PER4	103	66.692636	2.5989163	3.28	***
Lead	RE2200	009918	SAPPA CREEK	27	WB	PER4	416	292.36004	11.392851	14	***
Lead	SP2040	010173	LODGEPOLE CREEK	25	WB	PER4	163	109.46176	4.2655677	4.71	***
Lead	RE3195	009917	MUDDY CREEK	27	WB	REF4	219	149.88611	5.8408464	7.95	***

Table 25. Stations over chronic standard values for selenium, filtered dissolved selenium, and chlorpyrofos, 1997-2001 R-EMAP

Chemical	NDEQ_ID	STORET	STRMNAME	ECOREG	STR_CLAS	FieldRef4	Chronic value	Collected Value	Chronic Over
Selenium	RE1175	009711	HICKS CREEK	27	WB	PER4	5	7.28	***
Selenium	LP1156	010088	SHELL CREEK	27	WB	PER4	5	5.27	***
Selenium	MP2059	010151	SPRING CREEK	27	WA	PER4	5	6.22	***
Selenium	MP2055	010180	PLATTE RIVER (North Channel)	27	WA	PER4	5	7.85	***
Selenium	NI1238	009748	UNNAMED TRIB. PONCA CREEK	42	WB	PER4	5	5.15	***
Selenium	MT1131	009557	PIGEON CREEK (A)	47	WB	PER4	5	13.7	***
Selenium	EL2101	009558	MIDDLE LOGAN CREEK	47	WB	PER4	5	19.9	***
Selenium	EL1094	009569	UNION CREEK	47	WB	PER4	5	7.48	***
Selenium	EL1093	009570	TRACY CREEK	47	WB	PER4	5	16.5	***
Selenium	LP2159	009574	WAHOO CREEK	47	WA	PER4	5	5.29	***
Selenium	EL1095	009704	FREMONT STORM DRAINAGE CANAL	47	WB	PER4	5	9.61	***
Selenium	EL1095	009704	FREMONT STORM DRAINAGE CANAL	47	WB	PER4	5	9.61	***
Selenium	MT1130	009718	UNNAMED TRIB. BLACKBIRD CREEK (B)	47	WB	PER4	5	8.39	***
Selenium	MT1130	009718	UNNAMED TRIB. BLACKBIRD CREEK (B)	47	WB	PER4	5	8.39	***
Selenium	MT2139	009727	HOWE CREEK	47	CB	PER4	5	11.5	***
Selenium	LP2162	010091	SAND CREEK	47	WB	PER4	5	7.36	***
Selenium	LP2165	010094	DUCK CREEK	47	WB	PER4	5	7.49	***
Selenium	LP2167	010096	MILLER BRANCH	47	WB	PER4	5	6.15	***
Selenium	NE1179	010100	HONEY CREEK	47	WB	PER4	5	5.36	***
Selenium	NE1180	010101	COTTIER CREEK	47	WB	PER4	5	5.41	***
Selenium	EL1096	010181	UNNAMED TRIB. PEBBLE CREEK	47	WB	PER4	5	22.5	***
Selenium	EL1098	010183	MAPLE CREEK	47	WA	PER4	5	12.8	***
Selenium	EL1099	010184	ELKHORN RIVER (E)	47	WA	PER4	5	5.21	***
Selenium	EL2100	010185	LOGAN CREEK	47	WA	PER4	5	11.7	***
Selenium	EL2102	010186	UNNAMED TRIB. LOGAN CREEK	47	WB	PER4	5	29	***
Selenium	EL2103	010187	BAKER CREEK	47	WB	PER4	5	21.4	***
Selenium	EL2104	010188	DOG CREEK	47	WB	PER4	5	20.1	***
Selenium	EL3106	010190	NORTH FORK ELKHORN RIVER	47	WA	PER4	5	8.74	***
Selenium	MT1133	010197	UNNAMED TRIB. BIG PAPILLION CREEK	47	WB	PER4	5	11.4	***
Selenium	MT1134	010198	PIGEON CREEK (B)	47	WB	PER4	5	14.9	***
Selenium	MT2140	010202	EAST BOW CREEK	47	WB	PER4	5	8.95	***
Selenium	MT2142	010204	AOWA CREEK	47	WA	PER4	5	8.25	***
Selenium	MT2144	010206	BOW CREEK (B)	47	WB	PER4	5	10.6	***
Selenium	EL4108	010191	BATTLE CREEK	47	WA	REF4	5	10.7	***

Table 25. continued

Chemical	NDEQ_ID	STORET	STRMNAME	ECOREG	STR_CLAS	FieldRef4	Chronic value	Collected Value	Chronic Over
Selenium	MT1050	010195	UNNAMED TRIB. BLACKBIRD CREEK (A)	47	WB	REF4	5	5.42	***
Selenium	MT1050	010195	UNNAMED TRIB. BLACKBIRD CREEK (A)	47	WB	REF4	5	5.46	***
Selenium	MT1137	010201	OMAHA CREEK	47	WB	REF4	5	10.1	***
Selenium	MT2143	010205	UNNAMED TRIB. NORWEGIAN BOW CREEK	47	WB	REF4	5	9.85	***
Selenium	MT2145	010207	BOW CREEK (A)	47	WB	REF4	5	9.92	***
Selen-wdis	LP1156	010088	SHELL CREEK	27	WB	PER4	5	31	***
Selen-wdis	MT1131	009557	PIGEON CREEK (A)	47	WB	PER4	5	23.3	***
Selen-wdis	EL2101	009558	MIDDLE LOGAN CREEK	47	WB	PER4	5	16.9	***
Selen-wdis	EL1093	009570	TRACY CREEK	47	WB	PER4	5	11.9	***
Selen-wdis	LP1154	009583	FOUR MILE CREEK	47	WB	PER4	5	14.9	***
Selen-wdis	EL1095	009704	FREMONT STORM DRAINAGE CANAL	47	WB	PER4	5	9.11	***
Selen-wdis	EL1095	009704	FREMONT STORM DRAINAGE CANAL	47	WB	PER4	5	9.11	***
Selen-wdis	LP1155	009706	UNNAMED TRIB. MIDDLE CREEK	47	WB	PER4	5	6.44	***
Selen-wdis	LP1155	009706	UNNAMED TRIB. MIDDLE CREEK	47	WB	PER4	5	6.44	***
Selen-wdis	LP2163	010092	OAK CREEK	47	WB	PER4	5	5.06	***
Selen-wdis	LP2165	010094	DUCK CREEK	47	WB	PER4	5	7.59	***
Selen-wdis	LP2166	010095	MIDDLE CREEK	47	WB	PER4	5	38.3	***
Selen-wdis	LP2169	010098	HICKMAN BRANCH	47	WB	PER4	5	32.9	***
Selen-wdis	NE1179	010100	HONEY CREEK	47	WB	PER4	5	6.03	***
Selen-wdis	NE1180	010101	COTTIER CREEK	47	WB	PER4	5	6.78	***
Selen-wdis	NE2186	010105	UNNAMED TRIB. TURKEY CREEK	47	WB	PER4	5	5.04	***
Selen-wdis	NE2190	010109	N. FORK BIG NEMAHA RIVER	47	WA	PER4	5	14.4	***
Selen-wdis	NE3192	010111	LITTLE MUDDY CREEK	47	WB	PER4	5	7.61	***
Selen-wdis	EL1096	010181	UNNAMED TRIB. PEBBLE CREEK	47	WB	PER4	5	24.2	***
Selen-wdis	EL1097	010182	DRY CREEK	47	WB	PER4	5	9.99	***
Selen-wdis	EL2100	010185	LOGAN CREEK	47	WA	PER4	5	11.2	***
Selen-wdis	EL2102	010186	UNNAMED TRIB. LOGAN CREEK	47	WB	PER4	5	29.4	***
Selen-wdis	EL2104	010188	DOG CREEK	47	WB	PER4	5	18.1	***
Selen-wdis	EL3106	010190	NORTH FORK ELKHORN RIVER	47	WA	PER4	5	7.33	***
Selen-wdis	MT1133	010197	UNNAMED TRIB. BIG PAPILLION CREEK	47	WB	PER4	5	15.9	***
Selen-wdis	MT1134	010198	PIGEON CREEK (B)	47	WB	PER4	5	17.6	***
Selen-wdis	MT2140	010202	EAST BOW CREEK	47	WB	PER4	5	11.5	***
Selen-wdis	MT2144	010206	BOW CREEK (B)	47	WB	PER4	5	14.3	***
Selen-wdis	MP2054	010179	WOOD RIVER	27	WB	REF4	5	6.59	***

Table 25. continued

Chemical	NDEQ_ID	STORET	STRMNAME	ECOREG	STR_CLAS	FieldRef4	Chronic value	Collected Value	Chronic Over
Selen-wdis	EL4108	010191	BATTLE CREEK	47	WA	REF4	5	12.2	***
Selen-wdis	MT1137	010201	OMAHA CREEK	47	WB	REF4	5	14.2	***
Selen-wdis	MT2145	010207	BOW CREEK (A)	47	WB	REF4	5	10.7	***
Chlorpyrfos (Dursban)	NP3113	009702	DRY SPOTTEDTAIL CREEK	25	CB	PER4	0.041	0.05	***
Chlorpyrfos (Dursban)	SP1037	009724	SOUTH PLATTE RIVER (Brule)	25	WA	PER4	0.041	0.05	***
Chlorpyrfos (Dursban)	NP1101	010154	NORTH PLATTE RIVER	25	CB	PER4	0.041	0.05	***
Chlorpyrfos (Dursban)	NP2102	010155	NORTH PLATTE RIVER (North Channel	25	CB	PER4	0.041	0.05	***
Chlorpyrfos (Dursban)	NP2107	010159	NORTH PLATTE RIVER (South Channne	25	CB	PER4	0.041	0.05	***
Chlorpyrfos (Dursban)	NP2109	010161	UNNAMED TRIB. CEDAR CREEK	25	CB	PER4	0.041	0.05	***
Chlorpyrfos (Dursban)	NP3110	010162	NORTH CHANNEL NORTH PLATTE RIVER	25	CB	PER4	0.041	0.05	***
Chlorpyrfos (Dursban)	NP3111	010163	RED WILLOW CREEK	25	CA	PER4	0.041	0.05	***
Chlorpyrfos (Dursban)	SP1034	010168	SOUTH PLATTE RIVER	25	WA	PER4	0.041	0.05	***
Chlorpyrfos (Dursban)	SP1035	010169	SOUTH PLATTE RIVER (Sutherland)	25	CB	PER4	0.041	0.05	***
Chlorpyrfos (Dursban)	SP1036	010170	SOUTH PLATTE RIVER (Brule)	25	WA	PER4	0.041	0.05	***
Chlorpyrfos (Dursban)	SP1038	010171	PETERSON DITCH	25	WA	PER4	0.041	0.05	***
Chlorpyrfos (Dursban)	SP2039	010172	HIGHLINE CANAL	25	WB	PER4	0.041	0.05	***
Chlorpyrfos (Dursban)	SP2040	010173	LODGEPOLE CREEK	25	WB	PER4	0.041	0.05	***
Chlorpyrfos (Dursban)	SP2019	010174	LODGEPOLE CREEK	25	WB	PER4	0.041	0.05	***
Chlorpyrfos (Dursban)	MP2058	009553	NORTH DRY CREEK	27	WB	PER4	0.041	0.05	***
Chlorpyrfos (Dursban)	MP2060	009573	SPRING CREEK	27	WA	PER4	0.041	0.05	***
Chlorpyrfos (Dursban)	NP1100	009578	NORTH PLATTE RIVER	27	CB	PER4	0.041	0.05	***
Chlorpyrfos (Dursban)	MP1050	009580	PLATTE RIVER (SIDE CHANNEL)	27	WA	PER4	0.041	0.05	***
Chlorpyrfos (Dursban)	LO2037	009591	TURTLE CREEK	27	WA	PER4	0.041	0.3	***
Chlorpyrfos (Dursban)	LO2160	009708	MUNSON CREEK (A)	27	WB	PER4	0.041	0.3	***
Chlorpyrfos (Dursban)	LO1130	009721	S. BRANCH TIMBER CREEK	27	WB	PER4	0.041	0.3	***
Chlorpyrfos (Dursban)	LO2155	009738	DAVIS CREEK	27	WB	PER4	0.041	0.3	***
Chlorpyrfos (Dursban)	LO2155	009738	DAVIS CREEK	27	WB	PER4	0.041	0.3	***
Chlorpyrfos (Dursban)	LO2161	009978	MUNSON CREEK (B)	27	WB	PER4	0.041	0.3	***
Chlorpyrfos (Dursban)	LO3172	009980	MIDDLE LOUP RIVER (C)	27	WA	PER4	0.041	0.3	***
Chlorpyrfos (Dursban)	LO4175	009981	SOUTH LOUP RIVER	27	WA	PER4	0.041	0.3	***
Chlorpyrfos (Dursban)	LO4180	009982	MUD CREEK	27	WB	PER4	0.041	0.3	***
Chlorpyrfos (Dursban)	MP2057	010150	PLATTE RIVER	27	WA	PER4	0.041	0.05	***
Chlorpyrfos (Dursban)	MP2059	010151	SPRING CREEK	27	WA	PER4	0.041	0.05	***
Chlorpyrfos (Dursban)	MP2061	010152	PAWNEE CREEK	27	WB	PER4	0.041	0.05	***

Table 25. continued

Chemical	NDEQ_ID	STORET	STRMNAME	ECOREG	STR_CLAS	FieldRef4	Chronic value	Collected Value	Chronic Over
Chlorpyrfos (Dursban)	NP1099	010153	NORTH PLATTE RIVER	27	WA	PER4	0.041	0.05	***
Chlorpyrfos (Dursban)	SP1032	010166	FREMONT SLOUGH (MIDDLE)	27	CB	PER4	0.041	0.05	***
Chlorpyrfos (Dursban)	MP1051	010176	SILVER CREEK	27	WA	PER4	0.041	0.05	***
Chlorpyrfos (Dursban)	MP2052	010177	PLATTE RIVER (Issac Walton)	27	WA	PER4	0.041	0.05	***
Chlorpyrfos (Dursban)	MP2053	010178	PLATTE RIVER	27	WA	PER4	0.041	0.05	***
Chlorpyrfos (Dursban)	MP2055	010180	PLATTE RIVER (North Channel)	27	WA	PER4	0.041	0.05	***
Chlorpyrfos (Dursban)	NI2370	009565	VERDIGRE CREEK (A)	42	WA	PER4	0.041	0.3	***
Chlorpyrfos (Dursban)	NI1238	009748	UNNAMED TRIB. PONCA CREEK	42	WB	PER4	0.041	0.3	***
Chlorpyrfos (Dursban)	WH1065	009567	WHITE RIVER	43	WA	PER4	0.041	0.3	***
Chlorpyrfos (Dursban)	NI3415	009985	UNNAMED TRIB. NIOBRARA RIVER	43	WB	PER4	0.041	0.3	***
Chlorpyrfos (Dursban)	LO3171	009562	MIDDLE LOUP RIVER (A)	44	CB	PER4	0.041	0.3	***
Chlorpyrfos (Dursban)	NI4305	009596	PINE CREEK	44	CB	PER4	0.041	0.3	***
Chlorpyrfos (Dursban)	NI3395	009723	GORDON CREEK	44	CB	PER4	0.041	0.3	***
Chlorpyrfos (Dursban)	EL4109	009725	ELKHORN RIVER (B)	44	WA	PER4	0.041	0.05	***
Chlorpyrfos (Dursban)	EL4110	009726	ELKHORN RIVER (C)	44	WA	PER4	0.041	0.05	***
Chlorpyrfos (Dursban)	NP2104	009730	BLUE CREEK	44	CB	PER4	0.041	0.05	***
Chlorpyrfos (Dursban)	LO2085	009811	NORTH LOUP RIVER (B)	44	CB	PER4	0.041	0.3	***
Chlorpyrfos (Dursban)	LO2135	009816	CALAMUS RIVER	44	CB	PER4	0.041	0.3	***
Chlorpyrfos (Dursban)	LO2151	009977	NORTH LOUP RIVER (C)	44	CB	PER4	0.041	0.3	***
Chlorpyrfos (Dursban)	LO3166	009979	N. FORK DISMAL RIVER (B)	44	CB	PER4	0.041	0.3	***
Chlorpyrfos (Dursban)	NI3425	010014	WILLOW CREEK	44	CB	PER4	0.041	0.3	***
Chlorpyrfos (Dursban)	NP2103	010156	ASH CREEK	44	WB	PER4	0.041	0.05	***
Chlorpyrfos (Dursban)	NP2105	010157	BLUE CREEK	44	CB	PER4	0.041	0.05	***
Chlorpyrfos (Dursban)	NP2106	010158	BLUE CREEK	44	CB	PER4	0.041	0.05	***
Chlorpyrfos (Dursban)	SP1033	010167	FREMONT SLOUGH (WEST)	44	CB	PER4	0.041	0.05	***
Chlorpyrfos (Dursban)	EL4112	010193	HOLT CREEK	44	WA	PER4	0.041	0.064	***
Chlorpyrfos (Dursban)	EL4013	010194	SOUTH FORK ELKHORN RIVER	44	WA	PER4	0.041	0.05	***
Chlorpyrfos (Dursban)	MT1041	009556	TEKAMAHA CREEK (B)	47	WB	PER4	0.041	0.05	***
Chlorpyrfos (Dursban)	MT1131	009557	PIGEON CREEK (A)	47	WB	PER4	0.041	0.05	***
Chlorpyrfos (Dursban)	EL2101	009558	MIDDLE LOGAN CREEK	47	WB	PER4	0.041	0.05	***
Chlorpyrfos (Dursban)	EL1094	009569	UNION CREEK	47	WB	PER4	0.041	0.05	***
Chlorpyrfos (Dursban)	EL1093	009570	TRACY CREEK	47	WB	PER4	0.041	0.05	***
Chlorpyrfos (Dursban)	EL1095	009704	FREMONT STORM DRAINAGE CANAL	47	WB	PER4	0.041	0.05	***
Chlorpyrfos (Dursban)	EL1095	009704	FREMONT STORM DRAINAGE CANAL	47	WB	PER4	0.041	0.05	***

Table 25. continued

Chemical	NDEQ_ID	STORET	STRMNAME	ECOREG	STR_CLAS	FieldRef4	Chronic value	Collected Value	Chronic Over
Chlorpyrfos (Dursban)	MT1130	009718	UNNAMED TRIB. BLACKBIRD CREEK (B)	47	WB	PER4	0.041	0.05	***
Chlorpyrfos (Dursban)	MT1130	009718	UNNAMED TRIB. BLACKBIRD CREEK (B)	47	WB	PER4	0.041	0.05	***
Chlorpyrfos (Dursban)	MT2139	009727	HOWE CREEK	47	CB	PER4	0.041	0.05	***
Chlorpyrfos (Dursban)	EL1096	010181	UNNAMED TRIB. PEBBLE CREEK	47	WB	PER4	0.041	0.05	***
Chlorpyrfos (Dursban)	EL1097	010182	DRY CREEK	47	WB	PER4	0.041	0.05	***
Chlorpyrfos (Dursban)	EL1098	010183	MAPLE CREEK	47	WA	PER4	0.041	0.05	***
Chlorpyrfos (Dursban)	EL1099	010184	ELKHORN RIVER (E)	47	WA	PER4	0.041	0.05	***
Chlorpyrfos (Dursban)	EL2100	010185	LOGAN CREEK	47	WA	PER4	0.041	0.05	***
Chlorpyrfos (Dursban)	EL2102	010186	UNNAMED TRIB. LOGAN CREEK	47	WB	PER4	0.041	0.05	***
Chlorpyrfos (Dursban)	EL2103	010187	BAKER CREEK	47	WB	PER4	0.041	0.05	***
Chlorpyrfos (Dursban)	EL2104	010188	DOG CREEK	47	WB	PER4	0.041	0.05	***
Chlorpyrfos (Dursban)	EL3105	010189	DRY CREEK	47	WB	PER4	0.041	0.05	***
Chlorpyrfos (Dursban)	EL3106	010190	NORTH FORK ELKHORN RIVER	47	WA	PER4	0.041	0.05	***
Chlorpyrfos (Dursban)	MT1132	010196	WALNUT CREEK	47	WB	PER4	0.041	0.073	***
Chlorpyrfos (Dursban)	MT1133	010197	UNNAMED TRIB. BIG PAPILLION CREEK	47	WB	PER4	0.041	0.05	***
Chlorpyrfos (Dursban)	MT1134	010198	PIGEON CREEK (B)	47	WB	PER4	0.041	0.05	***
Chlorpyrfos (Dursban)	MT1135	010199	WOOD CREEK	47	WB	PER4	0.041	0.05	***
Chlorpyrfos (Dursban)	MT2140	010202	EAST BOW CREEK	47	WB	PER4	0.041	0.05	***
Chlorpyrfos (Dursban)	MT1136	010203	TEKAMAH CREEK (A)	47	WB	PER4	0.041	0.05	***
Chlorpyrfos (Dursban)	MT2142	010204	AOWA CREEK	47	WA	PER4	0.041	0.05	***
Chlorpyrfos (Dursban)	MT2146	010208	JORDON CREEK	47	WB	PER4	0.041	0.05	***
Chlorpyrfos (Dursban)	MT2146	010208	JORDON CREEK	47	WB	PER4	0.041	0.05	***
Chlorpyrfos (Dursban)	MT2147	010209	UNNAMED TRIB. BAZILE CREEK	47	WB	PER4	0.041	0.05	***
Chlorpyrfos (Dursban)	WH2049	009594	MONROE CREEK	25	CA	REF4	0.041	0.3	***
Chlorpyrfos (Dursban)	WH1037	009595	MIDDLE FORK SOLDIER CREEK	25	CA	REF4	0.041	0.3	***
Chlorpyrfos (Dursban)	SP2042	009740	LODGEPOLE CREEK	25	CB	REF4	0.041	0.05	***
Chlorpyrfos (Dursban)	NP2108	010160	RUSH CREEK	25	CB	REF4	0.041	0.05	***
Chlorpyrfos (Dursban)	NP3112	010164	NINEMILE CREEK	25	CA	REF4	0.041	0.05	***
Chlorpyrfos (Dursban)	LO3170	009563	MIDDLE LOUP RIVER (B)	27	WA	REF4	0.041	0.3	***
Chlorpyrfos (Dursban)	MP2062	010175	PAWNEE CREEK	27	WB	REF4	0.041	0.05	***
Chlorpyrfos (Dursban)	MP2054	010179	WOOD RIVER	27	WB	REF4	0.041	0.05	***
Chlorpyrfos (Dursban)	NI2385	009581	MIDDLE BRANCH VERDIGRE CREEK	42	CB	REF4	0.041	0.3	***
Chlorpyrfos (Dursban)	NI2380	009717	N. BRANCH VERDIGRE CREEK	42	CB	REF4	0.041	0.3	***
Chlorpyrfos (Dursban)	LO2150	009719	NORTH LOUP RIVER (A)	42	CB	REF4	0.041	0.3	***

Table 25. continued

Chemical	NDEQ_ID	STORET	STRMNAME	ECOREG	STR_CLAS	FieldRef4	Chronic value	Collected Value	Chronic Over
Chlorpyrfos (Dursban)	NI2390	009983	NIOBRARA RIVER (E)	42	WA	REF4	0.041	0.3	***
Chlorpyrfos (Dursban)	NI2371	009984	VERDIGRE CREEK (B)	42	WB	REF4	0.041	0.3	***
Chlorpyrfos (Dursban)	NI3405	009582	LONG PINE CREEK	43	CB	REF4	0.041	0.3	***
Chlorpyrfos (Dursban)	WH2070	009707	WARBONNET CREEK	43	CB	REF4	0.041	0.3	***
Chlorpyrfos (Dursban)	NI3410	009715	SHORT PINE CREEK	43	CA	REF4	0.041	0.3	***
Chlorpyrfos (Dursban)	NI3400	009716	UNNAMED TRIB. ROCK CREEK	43	CB	REF4	0.041	0.3	***
Chlorpyrfos (Dursban)	NI3420	010013	PLUM CREEK	43	CB	REF4	0.041	0.3	***
Chlorpyrfos (Dursban)	LO2145	009576	BIG CREEK	44	CB	REF4	0.041	0.3	***
Chlorpyrfos (Dursban)	LO3165	009577	N. FORK DISMAL RIVER (A)	44	CB	REF4	0.041	0.3	***
Chlorpyrfos (Dursban)	NI4392	009588	NIOBRARA RIVER (C)	44	WA	REF4	0.041	0.3	***
Chlorpyrfos (Dursban)	NI3410	009715	SHORT PINE CREEK	44	CA	REF4	0.041	0.3	***
Chlorpyrfos (Dursban)	NI3400	009716	UNNAMED TRIB. ROCK CREEK	44	CB	REF4	0.041	0.3	***
Chlorpyrfos (Dursban)	LO2140	009720	GOOSE CREEK	44	CB	REF4	0.041	0.3	***
Chlorpyrfos (Dursban)	NI4393	009742	NIOBRARA RIVER (B)	44	WA	REF4	0.041	0.3	***
Chlorpyrfos (Dursban)	NI3391	010015	NIOBRARA RIVER (D)	44	WA	REF4	0.041	0.3	***
Chlorpyrfos (Dursban)	NI2365	009566	UNNAMED TRIB. MERRIMAN CREEK	47	WB	REF4	0.041	0.3	***
Chlorpyrfos (Dursban)	EL4107	009579	ELKHORN RIVER (A)	47	WA	REF4	0.041	0.05	***
Chlorpyrfos (Dursban)	EL4108	010191	BATTLE CREEK	47	WA	REF4	0.041	0.05	***
Chlorpyrfos (Dursban)	EL4111	010192	ELKHORN RIVER (D)	47	WA	REF4	0.041	0.05	***
Chlorpyrfos (Dursban)	MT1050	010195	UNNAMED TRIB. BLACKBIRD CREEK (A)	47	WB	REF4	0.041	0.05	***
Chlorpyrfos (Dursban)	MT1050	010195	UNNAMED TRIB. BLACKBIRD CREEK (A)	47	WB	REF4	0.041	0.05	***
Chlorpyrfos (Dursban)	MT2141	010200	BEAVER CREEK	47	WB	REF4	0.041	0.05	***
Chlorpyrfos (Dursban)	MT1137	010201	OMAHA CREEK	47	WB	REF4	0.041	0.05	***
Chlorpyrfos (Dursban)	MT2143	010205	UNNAMED TRIB. NORWEGIAN BOW CREEK	47	WB	REF4	0.041	0.05	***
Chlorpyrfos (Dursban)	MT2145	010207	BOW CREEK (A)	47	WB	REF4	0.041	0.05	***

Table 26. Pearson correlation coefficients (r) for all sites for fish index (IBI8), macroinvertebrate index (BugSc) and habitat index (Habitat5) with the chemical constituents collected during 1997-2001 R-EMAP. Columns with asterisk (*) show significant differences (p<0.05).

Indices and Water Chemistries	Code	Habitat HBI Pearson Correlation Coefficient	Probability (p)	*	Number	Fish IBI8 Pearson Correlation Coefficient	Probability (p)	*	Number	Macroinvertebrate ICI Pearson Correlation Coefficient	Probability (p)	*	Number
IBI Fish Index	IBI8	0.32003	<0.0001	*	209	1.00000			210	0.02089	0.0027	*	204
Macroinvertebrate Index	BugsSc	0.26021	0.0002	*	204	0.20893	0.0027	*	204	1.00000			204
Habitat Index	Habitat5	1.00000			210	0.32003	<0.0001	*	210	0.26021	0.0002	*	204
Alkalinity, Bicarbonate	ALK_BICA_012	-0.01291	0.9378		39	0.19855	0.2256		39	-0.25819	0.1229		37
Alkalinity, Carbonate	ALK_CARB_013	-0.14100	0.3556		45	-0.02729	0.0697		45	-0.12093	0.4398		43
Ammonia	AMMONIA_018	-0.06543	0.3454		210	-0.04601	0.5073		210	-0.04601	0.5047		210
Arsenic	ARSEN_W_030	0.18564	0.0160	*	168	0.21247	0.0057	*	168	0.12161	0.1232		162
Barium	REMAM_W_032	-0.36551	<0.0001	*	209	-0.22281	0.0012	*	209	-0.14728	0.0360	*	203
Cadmium	CADMO_W_073	-0.03303	0.7655		84	0.08141	0.4616		84	-0.05139	0.6507		80
Calcium	REMAM_W_074	-0.35735	<0.0001	*	210	-0.20429	0.0029	*	210	-0.21127	0.0024	*	204
Chloride	CHLORIDE_082	0.01181	0.9151		84	-0.08997	0.4157		84	-0.24604	0.0278	*	80
Chromium	REMAM_W_098	-0.03852	0.5789		210	0.09422	0.1737		210	-0.03726	0.5967		204
Conductivity	REMAP_FP_103	-0.29074	<0.0001	*	209	-0.19842	0.0040	*	209	-0.31332	<0.0001	*	203
Copper	REMAM_W_104	0.07083	0.3036		210	0.02600	0.7080		210	-0.03968	0.5731		204
Dissolved Oxygen	REMAP_FP_164	-0.08194	0.2382		209	-0.11348	0.1018		209	0.03382	0.6319		203
Flow	REMAP_FP_177	0.21049	0.0024	*	206	0.14156	0.0424	*	206	-0.03620	0.6108		200
Hardness	HARD_CAL_194	-0.35852	<0.0001	*	210	-0.23637	0.0006	*	209	-0.25778	0.0002	*	204
Lead	LEAD_W_215	0.03639	0.6000		210	-0.11706	0.0906		210	-0.12838	0.0673		204
Magnesium	REMAM_W_216	-0.32449	<0.0001	*	210	-0.25932	0.0001	*	210	-0.29180	<0.0001	*	204
Mercury	MERCU_W_218	0.12349	0.0770		206	0.12540	0.0725		206	0.02823	0.6915		200
Nickel	REMAM_W_249	-0.18714	0.0065	*	210	-0.03770	0.5870		210	-0.12868	0.0666		204
Nitrogen, Kjeldahl	N_TK_W_259	-0.12641	0.1025		168	-0.09384	0.2263		168	-0.17130	0.0293	*	162
Nitrogen, NO3 NO2	NO3NO2_W_250	0.14001	0.1179		126	0.08320	0.3544		126	0.19657	0.0287	*	124
Nitrogen, Organic	N_ORG_257	-0.12329	0.0746		210	-0.08891	0.1994		210	-0.25104	0.0003	*	204
Nitrogen, Total, Calc	N_T_CALC_258	0.11421	0.0988		210	0.05533	0.4251		210	0.15922	0.0229	*	204
pH	REMAP_FP_284	-0.05179	0.4575		208	-0.16686	0.0149	*	208	-0.00027	0.9969		202
Phosphorus	P_T_W_289	-0.25016	0.0011	*	168	0.36240	<0.0001	*	167	-0.19065	0.0133	*	168
Potassium	REMAM_W_293	0.21359	0.0163	*	126	0.05484	0.5419		126	-0.02101	0.0037	*	122

Table 26. continued.

Indices and Water Chemistries	Code	Habitat HBI Pearson Correlation Coefficient	Probability (p)	*	Number	Fish IBI8 Pearson Correlation Coefficient	Probability (p)	*	Number	Macroinvertebrate ICI Pearson Correlation Coefficient	Probability (p)	*	Number
Selenium	SELEN_W_306	-0.23199	0.0007	*	210	-0.27485	<0.0001	*	210	-0.08536	0.2248		204
Silver	REMAP_W_307	0.30599	0.0046	*	84	-0.44595	<0.0001	*	83	0.30771	0.0004	*	84
Sodium	REMAM_W_309	0.02192	0.8075		126	-0.06595	0.4631		126	-0.26981	0.0027	*	122
Sulfates	SO4_W_316	0.01501	0.8922		84	-0.11960	0.2785		84	-0.13591	0.2293		80
Temperature, C	REMAP_FP_319	-0.08522	0.2198		209	-0.12196	0.0785		209	-0.07749	0.2718		203
Turbidity	TURB_NTU_354	-0.09645	0.2192		164	-0.11827	0.1315		164	-0.04979	0.5344		158
Zinc	REMAM_W_249	-0.00537	0.9383		210	0.08305	0.2307		210	-0.10894	0.1209		204
Arsenic, dissolved	ARSEN_WD_030	-0.04447	0.6210		126	0.01340	0.9086		126	-0.10531	0.2483		122
Barium, dissolved	REMAM_WD_032	-0.32150	0.0003	*	125	-0.20554	0.0215	*	125	-0.10374	0.2575		121
Calcium, dissolved	REMAM_WD_074	-0.08993	0.3186		125	-0.14086	0.1176		125	-0.04581	0.6178		121
Chromium, dissolved	REMAM_WD_098	-0.33357	0.0001	*	125	-0.09047	0.3157		125	0.04833	0.5986		121
Cooper, dissolved	REMAM_WD_104	-0.22812	0.0105	*	125	-0.00822	0.9275		125	0.01999	0.8277		121
Iron, dissolved	REMAM_WD_209	-0.08658	0.3370		125	0.06696	0.4581		125	-0.00330	0.9713		121
Lead, dissolved	LEAD_WD_215	-0.23529	0.0080		126	-0.14595	0.1030		126	-0.02321	0.7997		122
Magnesium, dissolved	REMAM_WD_216	-0.15860	0.0773		125	0.16309	-0.2642		125	-0.20265	0.0258	*	121
Manganese, dissolved	REMAM_WD_217	-0.21048	0.0185	*	125	0.07954	0.3779		125	-0.20117	0.0269	*	121
Mercury, dissolved	MERCU_WD_218	0.44324	<0.0001	*	83	0.28925	0.0080	*	83	0.00286	0.9800		79
Nickel, dissolved	REMAM_WD_249	-0.26423	0.0029	*	125	-0.00046	0.9960		125	0.02985	0.7452		121
Selenium, dissolved	SELEN_WD_306	-0.02455	0.0056	*	126	0.25794	0.0035	*	126	-0.00643	0.9439		122
Zinc, dissolved	REMAM_WD_361	-0.04858	0.5906		125	0.02266	0.8020		125	0.03510	0.7023		121
Alachlor	REMAP_W_010	0.42590	<0.0001	*	206	0.28573	<0.0001	*	206	0.18009	0.0107	*	200
Atrazine	REMAP_W_031	0.23674	0.0007	*	204	0.18444	0.0083	*	204	-0.03827	0.5924		198
Chlordane	REMAP_W_080	-0.42121	<0.0001	*	208	-0.27912	<0.0001	*	208	-0.20041	0.0042	*	202
Chlorpyrifox	REMAP_W_096	0.43468	<0.0001	*	208	0.29356	<0.0001	*	208	0.17123	0.0148	*	202
Diazine	REMAP_W_118	0.49700	<0.0001	*	207	0.35019	<0.0001	*	207	0.10862	0.1248		201
Metolachlor	REMAP_W_244	0.48784	<0.0001	*	186	0.29552	<0.0001	*	186	0.18136	0.0143	*	182
Propachlor	REMAP_W_296	0.07797	0.2629		208	0.07242	0.2986		208	-0.10510	0.1360		202
Trifluralin	REMAP_W_349	0.42982	<0.0001	*	208	-0.44852	<.0001	*	207	0.28905	<0.0001	*	208

Table 27. Summary statistics for sediment chemistry parameters collected from all perennial and reference streams in Nebraska, 1997-2001 R-EMAP

Stream Type / Chemical Indicator	Code	Minimum	25%tile	Median	75%tile	Maximum	Mean	Number sampled	Std.Dev.	Variance	Std.Error
Perennial Stream											
Disulfoton, ug/kg	REMAP_S_165	11	16	50.5	110	690	91.8	156	120.6	14545.5	9.66
Sediment, %	SOLIDS_311	37.8	58.8	65.2	69.5	85.8	64.6	86	9.05	81.9	0.98
Silver, mg/kg	REMAM_S_307	0.51	0.51	2	2	2	1.4	156	0.73	0.53	0.06
Barium, mg/kg	REMAM_S_032	4.5	92.5	152.5	171.5	415	134.7	156	65.9	4344.5	5.28
Chromium, mg/kg	REMAM_S_098	0.65	6.38	10.2	12.6	24.4	9.5	156	4.7	22.1	0.38
Copper, mg/kg	REMAM_S_104	0.27	4.41	7.89	10.7	22.8	7.9	156	4.76	22.7	0.38
Nickel, mg/kg	REMAM_S_249	0.5	4.87	10.4	14.7	29.7	10.6	156	6.69	44.7	0.54
Zinc, mg/kg	REMAM_S_361	1.38	21.1	35.7	46.2	96.1	34.5	156	19.3	370.7	1.54
Arsenic, mg/kg	ARSEN_S_030	0.34	1.36	2.84	6.03	86.9	4.93	156	8.82	77.8	0.71
Lead, mg/kg	LEAD_S_215	0.5	3.4	5.8	9.38	164	7.78	156	13.6	184.1	1.09
Selenium, mg/kg	SELEN_S_306	0.5	0.5	0.5	2.4	10.7	1.72	156	2.1	4.39	0.17
Mercury, mg/kg	MERCU_S_218	0.004	0.005	0.009	0.017	0.097	0.012	156	0.011	0.0001	0.0008
Cadmium, mg/kg	CADMI_S_073	0.02	0.09	0.31	0.5	5.09	0.49	121	0.74	0.55	0.07
BHC-B, ug/kg	REMAP_S_042	0.23	0.38	0.72	2	14	1.74	156	2.41	5.79	0.19
BHC-A, ug/kg	REMAP_S_043	0.23	1.05	1.9	3.3	42	2.77	156	4.07	16.5	0.33
BHC-G, ug/kg	REMAP_S_045	0.24	0.51	0.87	2.15	15	1.87	156	2.47	6.09	0.2
Aldrin, ug/kg	REMAP_S_011	0.23	0.55	1.3	2.7	57	3.52	156	7.8	60.9	0.62
Dieldrin, ug/kg	REMAP_S_144	0.23	0.73	1.45	3.4	25	2.81	156	3.82	14.6	0.31
Endrin, ug/kg	REMAP_S_169	0.7	1	2	7.85	55	6.34	156	9.4	88.5	0.75
DDE, ug/kg	REMAP_S_111	0.23	0.82	2.15	3.95	42	3.4	156	4.67	21.7	0.37
DDD, ug/kg	REMAP_S_110	0.65	2	3.25	27	210	20.5	156	35.2	1237.6	2.82
DDT, ug/kg	REMAP_S_112	0.47	1	2.5	4.75	42	4.15	156	5.5	30.2	0.44
Arochlor 1016, ug/kg	REMAP_S_023	21	29	50	195	1400	159.9	156	235	55212.5	18.8
Arochlor 1221, ug/kg	REMAP_S_024	12	23	59.5	120	1000	99.9	156	135.3	18303.6	10.8
Arochlor 1232, ug/kg	REMAP_S_025	4.7	10.5	28	49.5	940	63.3	156	127.1	16150.6	10.2
Arochlor 1242, ug/kg	REMAP_S_026	4.7	10.5	28	50.5	940	65.6	156	129.7	16830.2	10.4
Arochlor 1248, ug/kg	REMAP_S_027	9.4	21	48	100	1900	125	156	262.2	68740.5	21
Arochlor 1254, ug/kg	REMAP_S_028	2.4	9.6	19	33.5	420	28.4	156	40.4	1631.5	3.23
Arochlor 1260, ug/kg	REMAP_S_029	3.5	8.6	21	39.5	420	34.2	156	46.7	2178.1	3.74
Heptachlor, ug/kg	REMAP_S_195	0.47	0.74	1.1	4.95	38	4.13	156	6.44	41.4	0.52

Table 27. continued

Stream Type / Chemical Indicator	Code	Minimum	25%tile	Median	75%tile	Maximum	Mean	Number sampled	Std.Dev.	Variance	Std.Error
Heptachlor Epoxide, ug/kg	REMAP_S_196	0.23	0.55	1.3	2.6	57	3.19	156	7.4	54.7	0.59
cis-Chlordane, ug/kg	REMAP_S_079	0.61	1.3	2.85	9.8	69	8.11	156	12	142.9	0.96
trans-Chlordane, ug/kg	REMAP_S_081	0.62	1.3	2.9	9.9	69	8.15	156	12	143.5	0.96
cis-Nonachlor, ug/kg	REMAP_S_264	0.62	1.3	2.85	9.8	69	8.1	156	12	143	0.96
trans-Nonachlor, ug/kg	REMAP_S_265	0.62	1.1	2.85	7.85	55	6.79	156	9.78	95.6	0.78
Oxychlordane, ug/kg	REMAP_S_270	0.47	0.74	2.6	5.25	110	6.16	156	14.7	215.5	1.18
Atrazine, ug/kg	REMAP_S_031	6.4	70	85	120	1200	105.8	156	112.3	12618	8.99
Diazinon, ug/kg	REMAP_S_118	8.3	25	50	230	1900	186	156	315.7	99646.7	25.3
Metolachlor,ug/kg	REMAP_S_244	10	15	28	230	1900	148.9	156	244.7	59859.8	19.6
Alachlor, ug/kg	REMAP_S_010	3.1	4.4	9.65	61	910	55.1	156	106.3	11304.8	8.51
Chlorpyrifos, ug/kg	REMAP_S_096	1	1.4	1.9	24.5	1000	39.4	156	112.2	12597	8.97
Trifluralin, ug/kg	REMAP_S_349	0.62	1.3	4.15	13	140	11.7	156	18.2	332	1.46
Propachlor, ug/kg	REMAP_S_296	4.2	5.8	9.95	39	280	32	156	47	2205.9	3.76
Hexachlorobenzene, ug/kg	REMAP_S_199	0.19	0.37	1.5	2.6	21	2.33	126	2.95	8.72	0.26
TOC, ug/kg	TOC_S_329	0.09	0.09	0.12	0.82	9.15	0.62	70	1.22	1.48	0.15
Reference Stream											
Disulfoton, ug/kg	REMAP_S_165	3.8	15	26	83	590	90.6	55	128	16383.1	17.3
Sediment, %	SOLIDS_311	37.3	59.4	67.4	78.9	87.3	66.6	41	12.9	167.6	2.02
Silver, mg/kg	REMAM_S_307	0.15	0.51	0.62	2	2	0.99	55	0.69	0.47	0.09
Barium, mg/kg	REMAM_S_032	6.83	34.6	86.6	182	334	110.7	55	83.2	6921.9	11.2
Chromium, mg/kg	REMAM_S_098	0.65	2.55	5.74	11	21	7.25	55	5.31	28.2	0.72
Copper, mg/kg	REMAM_S_104	0.27	0.75	4	7.83	15.4	4.89	55	4.3	18.5	0.58
Nickel, mg/kg	REMAM_S_249	0.5	1.11	5.01	12.5	24.2	7.42	55	7.1	50.5	0.54
Zinc, mg/kg	REMAM_S_361	1.71	5.97	18.6	33.8	69.6	23.2	55	18.1	327.7	2.44
Arsenic, mg/kg	ARSEN_S_030	0.19	0.5	1.31	5	13.4	2.99	55	3.28	10.8	0.44
Lead, mg/kg	LEAD_S_215	0.5	1.19	2.76	6.42	23.7	5.24	55	5.87	34.5	0.79
Selenium, mg/kg	SELEN_S_306	0.19	0.5	0.5	0.64	5	1.27	55	1.68	2.81	0.23
Mercury, mg/kg	MERCU_S_218	0.004	0.004	0.006	0.013	0.033	0.009	55	0.007	0.00004	0.0009
Cadmium, mg/kg	CADMI_S_073	0.02	0.02	0.1	0.5	1.76	0.27	48	0.38	0.14	0.05
BHC-B, ug/kg	REMAP_S_042	0.23	0.32	0.46	2.3	12	1.8	55	2.59	6.72	0.35
BHC-A, ug/kg	REMAP_S_043	0.23	0.34	1.3	2.7	12	2.2	55	2.65	7	0.36

Table 27. continued

Stream Type / Chemical Indicator	Code	Minimum	25%tile	Median	75%tile	Maximum	Mean	Number sampled	Std.Dev.	Variance	Std.Error
BHC-G, ug/kg	REMAP_S_045	0.25	0.43	0.55	2.6	12	1.87	55	2.56	6.55	0.35
Aldrin, ug/kg	REMAP_S_011	0.23	0.34	0.77	2.6	12	1.97	55	2.57	6.62	0.35
Dieldrin, ug/kg	REMAP_S_144	0.23	0.41	0.77	3.9	18	2.75	55	3.88	15.1	0.52
Endrin, ug/kg	REMAP_S_169	0.69	1	1.7	6.6	47	6.84	55	10.4	107.2	1.4
DDE, ug/kg	REMAP_S_111	0.23	0.41	1.3	3.9	18	2.98	55	3.88	15.1	0.52
DDD, ug/kg	REMAP_S_110	0.87	2.5	4	25	180	24.5	55	5.38	1591.8	5.38
DDT, ug/kg	REMAP_S_112	0.46	0.67	1.3	5.2	23	4.08	55	5.34	28.5	0.72
Arochlor 1016, ug/kg	REMAP_S_023	22	26	44	170	1200	174.1	55	261.2	68227.4	35.2
Arochlor 1221, ug/kg	REMAP_S_024	12	17	26	130	590	94.4	55	128.4	16476.8	17.3
Arochlor 1232, ug/kg	REMAP_S_025	4.6	6.7	25	51	230	40.4	55	50.5	2548.5	6.8
Arochlor 1248, ug/kg	REMAP_S_027	9.2	13	26	100	470	76	55	101.6	10329.7	13.7
Arochlor 1254, ug/kg	REMAP_S_028	2.5	4.8	13	27	120	23.2	55	25.9	668.6	3.49
Arochlor 1260, ug/kg	REMAP_S_029	3.5	5	13	39	180	30.1	55	38.6	1491.8	5.2
Chlordane, ug/kg	REMAP_S_080	0.69	1.1	5.1	10	47	8.34	55	10.2	104.3	1.38
Heptachlor, ug/kg	REMAP_S_195	0.46	0.65	0.92	3.3	23	3.52	55	5.19	26.9	0.7
cis-Chlordane, ug/kg	REMAP_S_079	0.65	1.3	2.2	9	59	8.67	55	13	169	1.75
trans-Nonachlor, ug/kg	REMAP_S_265	0.65	1	1.8	9	47	7.01	55	10.3	106.3	1.39
Oxychlordane, ug/kg	REMAP_S_270	0.46	0.65	0.92	5.2	23	3.82	55	5.2	27	0.7
Atrazine, ug/kg	REMAP_S_031	6.7	36	75	100	310	84.7	55	64.2	4123.5	8.66
Diazinon, ug/kg	REMAP_S_118	8.7	25	44	170	1200	173.7	55	265.5	70500.5	35.8
Metolachlor,ug/kg	REMAP_S_244	11	14	63	320	2100	269.3	55	485.1	235342.9	65.4
Alachlor, ug/kg	REMAP_S_010	3.2	4.3	24	150	1000	124.5	55	238.4	56817.8	32.1
Chlorpyrifos, ug/kg	REMAP_S_096	1.1	1.3	3.8	71	1100	130	55	269.9	72821.3	36.4
Trifluralin, ug/kg	REMAP_S_349	0.65	1.3	4.8	27	160	21.6	55	37.4	1397.6	5.04
Propachlor, ug/kg	REMAP_S_296	4.3	5.3	8.8	33	230	34.8	55	52.1	2713.1	7.02
Hexachlorobenzene, ug/kg	REMAP_S_199	0.2	0.27	1.1	2.3	12	2.05	43	2.59	6.69	0.39
TOC, ug/kg	TOC_S_329	0.09	0.09	0.11	0.37	5.93	0.66	14	1.55	2.4	0.41

Table 28. Sediment chemical ranges and number of stations over the standard levels using SQuiRTS[(a)] guidelines, 1997-2001 R-EMAP.

Analyte Type/Chemical	Perennial Sites Total Samples	Perennial Concentration Range, mg/k	Number Sites Over Criteria	Reference Sites Total Samples	Reference Concentration Range, mg/k	Number of Sites Over Criteria	Comparative Criteria, mg/kg (a)
Organochlorines & Organophosphates							
Alachlor	156	31-910		55	3.2-1000		No Criteria Available
Aldrin	156	0.23-57	All*	55	0.23-2.6	All*	0.04 ppm (b)
Arochlor 1016	156	21-1400		55	22-1200		No Criteria Available
Arochlor 1221	156	12-1000		55	12-590		No Criteria Available
Arochlor 1232	156	4.7-940		55	4.6-230		No Criteria Available
Arochlor 1242	156	4.7-940		55	4.7-215		No Criteria Available
Arochlor 1248	156	9.4-1900		55	9.2-470		No Criteria Available
Arochlor 1254	156	2.4-420		55	2.5-120		No Criteria Available
Arochlor 1260	156	3.5-420		55	3.5-180		No Criteria Available
Atrazine	156	6.4-1200		55	6.7-100		No Criteria Available
alpha-BHC	156	0.23-42		55	0.23-12		No Criteria Available
beta-BHC	156	0.23-14		55	0.23-12		No Criteria Available
gamma-BHC	156	0.24-2.15		55	0.23-12		No Criteria Available
Chlordane	156	1.1-120	All*	55	1.1-47	All*	0.0089 (b)
cis-Chlordane	156	0.61-69		55	0.65-59		No Criteria Available
trans-Chlordane	156	0.62-69		55	0.65-58		No Criteria Available
Chlorpyrifos	156	1-1000		55	1.1-1100		No Criteria Available
DDD	156	0.65-210	All*	55	0.87-180	All*	0.00851 (b)
DDE	156	0.23-42	All*	55	0.23-18	All*	0.00675 (b)
DDT	156	0.47-42	All*	55	0.46-23	All*	0.0445 (b)
Diazinon	156	8.3-1900		55	8.7-1200		No Criteria Available
Dieldrin	156	0.23-25	All*	55	0.23-318	All*	0.00667 (d)
Disulfoton	156	11-690		55	3.8-590		No Criteria Available
Endrin	156	0.7-55	All*	55	0.69-47	All*	0.0624 (d)
Heptachlor	156	0.47-38	All*	55	0.46-23	All*	0.01 (c)

Table 28. continued

Analyte Type/Chemical	Perennial Sites Total Samples	Perennial Concentration Range, mg/k	Number Sites Over Criteria	Reference Sites Total Samples	Reference Concentration Range, mg/k	Number of Sites Over Criteria	Comparative Criteria, mg/kg (a)
Heptachlor epoxide	156	0.23-57	All*	55	0.23-12	All*	0.00274 (b)
Hexachlorobenzene	156	0.19-21	All*	55	0.2-12	All*	0.1(c)
Metolachlor	156	10-1900		55	10-2100		No Criteria Available
cis-Nonachlor	156	0.62-69		55	0.65-47		No Criteria Available
trans-Nonachlor	156	0.62-69		55	0.65-55		No Criteria Available
Oxychlordane	156	0.47-110		55	0.46-23		No Criteria Available
Propachlor	156	4.2-280		55	4.3-230		No Criteria Available
Trifluralin	156	0.62-140		55	0.65-160		No Criteria Available
Trace Elements							
Total Arsenic	156	0.34-86.9	3	55	0.19-13.4	0	17.0 (b)
Total Barium	156	4.5-171.5	0	55	6.83-334		No Criteria Available
Total Cadmium	121	0.02-5.09	0	48	0.02-1.76	0	3.53 ppm (b)
Total Chromium	156	0.65-24.4	0	55	0.65-11	0	90.0 (b)
Total Copper	156	0.27-22.8	0	55	0.27-15.4	0	197.0 (b)
Total Lead	156	0.5-164	1	55	0.5-23.7	0	91.3 (b)
Total Mercury	156	.004-.097	0	55	0.004-0.033	0	0.486 (b)
Total Nickel	156	0.5-29.7	0	55	0.5-24.2	0	35.9 (b)
Total Selenium	156	0.5-10.7		55	0.19-5		No Criteria Available
Total Silver	156	0.51-2		55	0.15-2		No Criteria Available
Total Solids	86	37.8-85.8		41	37.3-87.3		No Criteria Available
Total Zinc	156	1.38-96.1	0	55	1.71-69.6	0	315.0 (b)
TOC	70	0.09-9.15		55	0.09-5.93		No Criteria Available

* Critreria is below detection limit.

(a) NOAA Sediment Screening Guidelines (1999 update)

(b) Probable Effects Level (PEL)

(c) Upper Effects Threshold (UET)

(d) EPA proposed criteria, based on equilibrium partitioning

Table 29. Stations over standard values for arsenic and lead for sediment chemistries, 1997-2001 R-EMAP.

STORET	FieldRef4	Stream Class	Ecoregion	Stream Name	Collected Value	Sediment Standard[a]	Analyte
010199	PER4	WB	47	WOOD CREEK	35.1	17[b]	Arsenic
010177	PER4	WA	27	PLATTE RIVER	56.3	17[b]	Arsenic
010163	PER4	CA	25	RED WILLOW CREEK	86.9	17[b]	Arsenic
010177	PER4	WA	27	PLATTE RIVER	164	91.3[b]	Lead

[a]NOAA Sediment Screening Guidelines (1999 update
[b]Probable Effects Level (PEL)

Table 30. Risk-based assessment contaminant values used in Nebraska for fish tissue evaluations.

CONTAMINANT UPPER LIMITS

70 kg (154 lb) individual consuming 8 ounces weekly over 70 years (lifetime risk)

	CARCINOGENIC HEALTH RISK					NON-CARCINOGENIC HEALTH RISK				
CONTAMINANT	CONC. (mg/kg)	EXPOSURE (mg/kg/d)	POTENCY FACTOR (q*)	INCREASED CANCER RISK	FDA CRITERIA	CONC. (mg/kg)	EXPOSURE (mg/kg/d)	Ref. Dose (RfD)	HAZARD INDEX	FDA CRITERIA
Cadmium				-		1.080	0.000499886	0.0005	1.00	
Lead				-			0		-	
Selenium				-		10.750	0.004975714	0.005	1.00	
Mercury				-	1.0	0.215	9.95143E-05	0.0001	1.00	1.0
Lindane (g-BHC)				-	(0.1-0.5)	0.645	0.000298543	0.0003	1.00	(0.1-0.5)
Dieldrin	0.014	6.24857E-06	16	1.00E-04	0.3	0.108	4.99886E-05	0.00005	1.00	0.3
4,4 DDE	0.636	0.000294377	0.34	1.00E-04	5.0		0		-	5.0
4,4 DDD	0.900	0.000416571	0.24	1.00E-04	5.0		0		-	5.0
4,4 DDT	0.636	0.000294377	0.34	1.00E-04	5.0	1.075	0.000497571	0.0005	1.00	5.0
PCB-1248	0.108	4.99886E-05	2.0	1.00E-04			0		-	
PCB-1254	0.108	4.99886E-05	2.0	1.00E-04	2.0	0.043	1.99029E-05	0.00002	1.00	2.0
PCB-1260	0.108	4.99886E-05	2.0	1.00E-04			0		-	
Tech. Chlordane	0.620	0.000286971	0.35	1.00E-04	0.3	1.075	0.000497571	0.0005	1.00	0.3
Heptachlor	0.048	2.22171E-05	4.5	1.00E-04	0.3	1.075	0.000497571	0.0005	1.00	0.3
Heptachlor Epoxide	0.024	0.000011016	9.1	1.00E-04	0.3	0.028	0.00001296	0.000013	1.00	0.3
cis-Chlordane *	0.620	0.000286971	0.35	1.00E-04		1.075	0.000497571	0.0005	1.00	
trans-Chlordane *	0.620	0.000286971	0.35	1.00E-04		1.075	0.000497571	0.0005	1.00	
cis-Nonachlor *	0.620	0.000286971	0.35	1.00E-04		1.075	0.000497571	0.0005	1.00	
trans-Nonachlor *	0.620	0.000286971	0.35	1.00E-04		1.075	0.000497571	0.0005	1.00	
Hexachlorobenzene	0.135	6.24857E-05	1.6	1.00E-04		1.730	0.000800743	0.0008	1.00	
Oxychlordane *	0.620	0.000286971	0.35	1.00E-04		1.075	0.000497571	0.0005	1.00	
Pentachloroanisole **	1.800	0.000833143	0.12	1.00E-04		65.000	0.030085714	0.03	1.00	
Trifluralin	28.100	0.013006286	0.0077	1.00E-04		16.200	0.007498286	0.0075	1.00	

Chlordane constituents are assigned RfD and q factors as assigned to chlordane in IRIS

**Pentachloroanisole values for Rfd and q* are based on pentachlorophenol values in IRIS

Boldface and italics indicate contaminants of primary and high concern, respectively

Table 31. Summary statistics for fish tissue parameters collected from all perennial and reference streams in Nebraska, 1997-2001 R-EMAP.

Stream Type / Chemical Indicator	Code	Minimum	25%tile	Median	75%tile	Maximum	Mean	Number Sampled	Std.Dev.	Variance	Std. Error
Perennial Stream											
Arsenic, ug/L	METAL_F_030	0.5	0.5	0.5	0.5	0.63	0.51	65	0.02	0.0005	0.003
Barium, mg/L	TM04	0.41	3.12	4.59	7.63	11.1	5.24	25	2.98	8.88	0.6
Chromium, mg/L	TM08	0.1	0.1	0.1	0.1	0.1	0.1	26	0	0	0
Zinc, mg/L	TM20	11.6	14.3	65.8	100.5	156	63.4	24	49.5	2448.8	10.1
Cadmium, mg/L	METAL_F_073	0	0.05	0.06	0.06	0.17	0.06	63	0.04	0.001	0.005
Lead, mg/L	METAL_F_215	0	0.05	0.17	0.17	0.17	0.12	72	0.06	0.004	0.007
Mercury, mg/L	MERCU_WF_218	0	0.026	0.051	0.081	0.197	0.056	73	0.043	0.002	0.005
BHC-A, mg/L	REMAP_WF_042	0	0.0008	0.002	0.002	0.003	0.002	76	0.00098	9.71E-07	0.0001
BHC-B, mg/L	REMAP_WF_043	0	0.001	0.005	0.005	0.024	0.0042	76	0.0042	0.00002	0.0005
BHC-G, mg/L	REMAP_WF_045	0	0.001	0.002	0.002	0.004	0.0017	76	0.0012	1.36E-06	0.00013
Aldrin, mg/L	REMAP_WF_011	0	0.0008	0.003	0.006	0.008	0.003	76	0.0027	7.27E-06	0.0003
Dieldrin, mg/L	REMAP_WF_144	0	0.001	0.005	0.007	0.023	0.005	75	0.005	0.00002	0.0005
Endrin, mg/L	REMAP_WF_169	0	0.003	0.004	0.008	0.015	0.005	76	0.004	0.00002	0.0005
DDE-p, mg/L	REMAP_WF_111	0	0.005	0.012	0.029	0.3	0.029	73	0.052	0.003	0.006
DDD-p, mg/L	REMAP_WF_110	0	0.004	0.008	0.012	0.032	0.008	76	0.005	0.00003	0.0006
DDT-p, mg/L	REMAP_WF_112	0	0.002	0.005	0.005	0.038	0.005	76	0.005	0.00003	0.0006
Arochlor 1016, mg/L	REMAP_WF_023	0	0.07	0.1	0.1	0.2	0.094	76	0.06	0.0036	0.0069
Arochlor 1221, mg/L	REMAP_WF_024	0	0.05	0.06	0.06	0.25	0.083	76	0.082	0.0068	0.0094
Arochlor 1232, mg/L	REMAP_WF_025	0	0.02	0.08	0.08	0.1	0.052	76	0.038	0.0014	0.0044
Arochlor 1242, mg/L	REMAP_WF_026	0	0.019	0.04	0.04	0.1	0.039	75	0.033	0.0011	0.0038
Arochlor 1248, mg/L	REMAP_WF_027	0	0.027	0.04	0.04	0.2	0.06	76	0.068	0.0047	0.0078
Arochlor 1254, mg/L	REMAP_WF_028	0	0.009	0.03	0.065	0.11	0.042	75	0.035	0.0013	0.0041
Arochlor 1260, mg/L	REMAP_WF_029	0	0.012	0.02	0.055	0.12	0.037	76	0.037	0.0013	0.0042
Chlordane, mg/L	REMAP_WF_080	0	0.003	0.03	0.051	0.19	0.04	71	0.042	0.0018	0.005
Heptachlor, mg/L	REMAP_WF_195	0	0.002	0.003	0.003	0.005	0.0024	76	0.0013	1.58E-06	0.00014
Heptachlor epoxide, mg/L	REMAP_WF_196	0	0.001	0.003	0.005	0.009	0.0029	75	0.0022	4.87E-06	0.00025
cis-Chlordane, mg/L	REMAP_WF_079	0	0.002	0.002	0.006	0.13	0.0058	74	0.015	0.00023	0.0018
trans-Chlordane, mg/L	REMAP_WF_081	0	0.002	0.002	0.005	0.012	0.0041	73	0.0042	0.00002	0.0005
cis-Nonachlor, mg/L	REMAP_WF_264	0	0.002	0.002	0.0036	0.012	0.0038	76	0.0041	0.00002	0.0005
Stream Type / Chemical Indicator	**Code**	**Minimum**	**25%tile**	**Median**	**75%tile**	**Maximum**	**Mean**	**Number Sampled**	**Std.Dev.**	**Variance**	**Std. Error**

Table 31. continued.

Stream Type / Chemical Indicator	Code	Minimum	25%tile	Median	75%tile	Maximum	Mean	Number Sampled	Std.Dev.	Variance	Std. Error
Oxychlordane, mg/L	REMAP_WF_270	0	0.001	0.002	0.002	0.012	0.003	76	0.004	0.00002	0.0005
Diazinon, mg/L	REMAP_WF_118	0	0.05	0.1	0.2	0.25	0.12	52	0.087	0.008	0.012
Chlorpyrifos, mg/L	REMAP_WF_096	0	0.001	0.001	0.003	0.37	0.009	76	0.043	0.002	0.005
Hexachlorobenzene,mg/L	REMAP_WF_199	0	0.001	0.001	0.005	0.005	0.002	75	0.002	3.76E-06	0.0002
Selenium, mg/L	METALS_F_306	0.1	1.38	3	4.26	9.79	3.12	52	2.47	6.08	0.34
Reference Stream											
Arsenic, mg/L	METAL_F_030	0.5	0.5	0.5	0.5	0.5	0.5	21	0.005	0.00002	0.001
Barium, mg/L	TM04	0.05	3.1	4.4	6.9	12.1	4.9	12	3.39	11.5	0.98
Chromium, mg/L	TM08	0.1	0.1	0.1	0.1	0.15	0.11	12	0.016	0.0003	0.005
Zinc, mg/L	TM20	13	14.9	26.8	75.2	106	44.5	12	34.7	1206	10.03
Cadmium, mg/L	METAL_F_073	0	0.05	0.06	0.06	0.1	0.05	21	0.02	0.0006	0.005
Lead, mg/L	METAL_F_215	0.05	0.1	0.1	0.17	0.17	0.12	21	0.045	0.002	0.009
Mercury, mg/L	MERCU_WF_218	0	0.033	0.055	0.073	0.16	0.058	22	0.038	0.0014	0.0081
BHC-A, mg/L	REMAP_WF_042	0	0.001	0.001	0.003	0.003	0.002	22	0.001	9.50E-07	0.0002
BHC-B, mg/L	REMAP_WF_043	0	0.001	0.001	0.01	0.01	0.004	22	0.004	0.00002	0.0009
BHC-G, mg/L	REMAP_WF_045	0	0.001	0.0015	0.0036	0.015	0.0025	22	0.003	9.20E-06	0.0006
Aldrin, mg/L	REMAP_WF_011	0	0.003	0.006	0.008	0.016	0.0055	22	0.004	0.00001	0.0008
Dieldrin, mg/L	REMAP_WF_144	0	0.001	0.004	0.006	0.022	0.005	22	0.006	0.00003	0.001
Endrin, mg/L	REMAP_WF_169	0	0.003	0.004	0.008	0.015	0.007	22	0.005	0.00002	0.001
DDE-p, mg/L	REMAP_WF_111	0	0.004	0.01	0.021	0.076	0.017	21	0.021	0.0004	0.005
DDD-p, mg/L	REMAP_WF_110	0	0.008	0.012	0.012	0.024	0.01	22	0.005	0.00002	0.001
DDT-p, mg/L	REMAP_WF_112	0	0.002	0.002	0.01	0.01	0.005	22	0.004	0.00001	0.0008
Arochlor 1016, mg/L	REMAP_WF_023	0	0.07	0.07	0.2	0.2	0.1	22	0.06	0.004	0.01
Arochlor 1221, mg/L	REMAP_WF_024	0	0.06	0.06	0.25	0.25	0.11	22	0.09	0.01	0.02
Arochlor 1232, mg/L	REMAP_WF_025	0	0.02	0.02	0.1	0.1	0.05	22	0.04	0.001	0.008
Arochlor 1242, mg/L	REMAP_WF_026	0	0.02	0.02	0.1	0.1	0.04	22	0.04	0.001	0.008
Arochlor 1248, mg/L	REMAP_WF_027	0	0.027	0.03	0.2	0.2	0.077	22	0.078	0.006	0.017
Arochlor 1254, mg/L	REMAP_WF_028	0	0.009	0.03	0.1	0.1	0.04	21	0.04	0.002	0.009
Arochlor 1260, mg/L	REMAP_WF_029	0	0.012	0.012	0.1	0.1	0.037	22	0.04	0.002	0.008
Chlordane, mg/L	REMAP_WF_080	0	0.003	0.026	0.032	0.14	0.035	19	0.041	0.002	0.009
Heptachlor, mg/L	REMAP_WF_195	0	0.002	0.003	0.004	0.005	0.003	22	0.001	1.40E-06	0.0003
Heptachlor epoxide, mg/L	REMAP_WF_196	0	0.001	0.003	0.006	0.008	0.003	22	0.002	5.90E-06	0.0005

Table 31. continued.

Stream Type / Chemical Indicator	Code	Minimum	25%tile	Median	75%tile	Maximum	Mean	Number Sampled	Std.Dev.	Variance	Std. Error
cis-Chlordane, mg/L	REMAP_WF_079	0	0.002	0.002	0.012	0.012	0.005	22	0.0046	0.00002	0.001
trans-Chlordane, mg/L	REMAP_WF_081	0	0.002	0.002	0.012	0.012	0.005	22	0.005	0.00002	0.001
cis-Nonachlor, mg/L	REMAP_WF_264	0	0.002	0.002	0.012	0.012	0.005	22	0.005	0.00002	0.001
trans-Nonachlor, mg/L	REMAP_WF_265	0	0.004	0.004	0.012	0.017	0.006	22	0.005	0.00002	0.001
Oxychlordane, mg/L	REMAP_WF_270	0	0.002	0.002	0.012	0.012	0.005	22	0.005	0.00002	0.001
Diazinon, mg/L	REMAP_WF_118	0	0.05	0.2	0.2	0.25	0.15	19	0.08	0.01	0.02
Chlorpyrifos, mg/L	REMAP_WF_096	0	0.001	0.001	0.005	0.025	0.006	22	0.009	0.00008	0.002
Hexachlorobenzene,mg/L	REMAP_WF_199	0	0.001	0.001	0.005	0.005	0.003	22	0.002	4.80E-06	0.0004
Selenium, mg/L	METALS_F_306	0.1	0.1	1.8	5	7.2	2.4	18	2.6	6.6	0.6

Table 32. Fish tissue stations exceeding Risk-Based Assessment (RBA) levels, 1997-2001 Nebraska R-EMAP.

Chemical	STORET	FieldRef4	Stream Class	Ecoregion	Stream Name	Year	Collection Value, mg/k	Health Risk Limit, mg/k	Exceeded RBA levels
Dieldrin	009553	PER4	WB	27	NORTH DRY CREEK	2001	0.014	0.014	***
Dieldrin	010185	PER4	WA	47	LOGAN CREEK	2000	0.016	0.014	***
Dieldrin	010184	PER4	WA	47	ELKHORN RIVER (E)	2000	0.022	0.014	***
Dieldrin	010183	PER4	WA	47	MAPLE CREEK	2000	0.023	0.014	***
Dieldrin	010191	REF4	WA	47	BATTLE CREEK	2000	0.018	0.014	***
Dieldrin	009579	REF4	WA	47	ELKHORN RIVER (A)	2000	0.022	0.014	***

Table 33. 1997-2001 R-EMAP stream ratings using IBI fish scores and ICI macroinvertebrate scores.

STORET	NDEQ_ID	STRMNAME	ecoplace	ECOREG	strmsize	coldwarm	FieldRef4	Habscore5	Habuse	ibi8	IBIuse	BugSc	ICIuse	Final Rating
010209	MT2147	UNNAMED TRIB. BAZILE CREEK	East 47 271	47	mediu	Warm	PER4	32	Fair	90.81	Excellent	28	Excellent	Excellent
010205	MT2143	UNNAMED TRIB. NORWEGIAN BOW CREEK	East 47 271	47	mediu	Warm	REF4	44	Excellent	61.06	Excellent	22	Excellent	Excellent
010203	MT1136	TEKAMAH CREEK (A)	East 47 271	47	large	Warm	PER4	36	Good	67.92	Excellent	22	Excellent	Excellent
010201	MT1137	OMAHA CREEK	East 47 271	47	large	Warm	REF4	38	Excellent	61.25	Excellent	22	Excellent	Excellent
010200	MT2141	BEAVER CREEK	East 47 271	47	mediu	Warm	REF4	48	Excellent	66.47	Excellent	24	Excellent	Excellent
010191	EL4108	BATTLE CREEK	East 47 271	47	mediu	Warm	REF4	38	Excellent	60.99	Excellent	28	Excellent	Excellent
010189	EL3105	DRY CREEK	East 47 271	47	small	Warm	PER4	30	Fair	64.50	Excellent			Excellent
010175	MP2062	PAWNEE CREEK	West 25 27	27	mediu	Warm	REF4	48	Excellent	69.87	Excellent	26	Excellent	Excellent
010169	SP1035	SOUTH PLATTE RIVER (Sutherland)	West 25 27	25	large	Cold	PER4	40	Excellent	66.25	Excellent			Excellent
010166	SP1032	FREMONT SLOUGH (MIDDLE)	West 25 27	27	mediu	Cold	PER4	32	Fair	87.82	Excellent	22	Excellent	Excellent
010160	NP2108	RUSH CREEK	West 25 27	25	mediu	Cold	REF4	48	Excellent	64.38	Excellent	22	Excellent	Excellent
010158	NP2106	BLUE CREEK	Sand 44	44	large	Cold	PER4	46	Good	69.09	Excellent	24	Excellent	Excellent
010157	NP2105	BLUE CREEK	Sand 44	44	large	Cold	PER4	42	Good	74.21	Excellent	24	Excellent	Excellent
010153	NP1099	NORTH PLATTE RIVER	West 25 27	27	large	Warm	PER4	34	Fair	76.21	Excellent	22	Excellent	Excellent
010152	MP2061	PAWNEE CREEK	West 25 27	27	mediu	Warm	PER4	38	Fair	74.58	Excellent	22	Excellent	Excellent
010151	MP2059	SPRING CREEK	West 25 27	27	mediu	Warm	PER4	36	Fair	74.14	Excellent	22	Excellent	Excellent
010101	NE1180	COTTIER CREEK	East 47 271	47	mediu	Warm	PER4	36	Good	82.26	Excellent	22	Excellent	Excellent
010015	NI3391	NIOBRARA RIVER (D)	Sand 44	44	large	Warm	REF4	46	Good	65.79	Excellent	22	Excellent	Excellent
010013	NI3420	PLUM CREEK	NW 43	43	large	Cold	REF4	44	Good	76.20	Excellent	18	Excellent	Excellent
009977	LO2151	NORTH LOUP RIVER (C)	Sand 44	44	large	Cold	PER4	46	Good	76.64	Excellent	24	Excellent	Excellent
009924	RE3094	FRENCHMAN CREEK (A)	West 25 27	27	large	Cold	REF4	48	Excellent	64.16	Excellent	22	Excellent	Excellent
009916	RE3190	SPRING CREEK	West 25 27	25	mediu	Cold	PER4	26	Poor	83.71	Excellent	22	Excellent	Excellent
009904	BB1003	SPRING CREEK (BB)	East 47 271	271	mediu	Warm	REF4	44	Excellent	68.29	Excellent	22	Excellent	Excellent
009900	LB1002	COON CREEK	East 47 271	271	small	Warm	PER4	36	Good	77.03	Excellent			Excellent
009818	RE3185	FRENCHMAN CREEK (B)	West 25 27	25	large	Cold	REF4	48	Excellent	84.82	Excellent	20	Excellent	Excellent
009817	RE1181	FARMERS CREEK	West 25 27	27	mediu	Warm	REF4	46	Good	68.64	Excellent	24	Excellent	Excellent
009814	LB2115	ROCK CREEK	East 47 271	271	small	Warm	REF4	46	Excellent	69.38	Excellent	26	Excellent	Excellent

Table 33. continued.

STORET	NDEQ_ID	STRMNAME	ecoplace	ECOREG	strmsize	coldwarm	FieldRef4	Habscore5	Habuse	ibi8	IBIuse	BugSc	ICIuse	Final Rating
009738	LO2155	DAVIS CREEK	West 25 27	27	mediu	Warm	PER4	28	Poor	76.17	Excellent	24	Excellent	Excellent
009738	LO2155	DAVIS CREEK	West 25 27	27	mediu	Warm	PER4	30	Poor	76.17	Excellent	24	Excellent	Excellent
009727	MT2139	HOWE CREEK	East 47 271	47	mediu	Cold	REF4	52	Excellent	66.88	Excellent	22	Excellent	Excellent
009726	EL4110	ELKHORN RIVER (C)	Sand 44	44	large	Warm	PER4	36	Fair	75.14	Excellent	26	Excellent	Excellent
009720	LO2140	GOOSE CREEK	Sand 44	44	large	Cold	REF4	50	Excellent	80.26	Excellent	26	Excellent	Excellent
009717	NI2380	N. BRANCH VERDIGRE CREEK	NE 42	42	large	Cold	REF4	52	Excellent	80.71	Excellent	28	Excellent	Excellent
009595	WH1037	MIDDLE FORK SOLDIER CREEK	West 25 27	25	mediu	Cold	REF4	48	Excellent	64.46	Excellent	24	Excellent	Excellent
009588	NI4392	NIOBRARA RIVER (C)	Sand 44	44	large	Warm	REF4	50	Excellent	65.82	Excellent	28	Excellent	Excellent
009582	NI3405	LONG PINE CREEK	NW 43	43	large	Cold	REF4	48	Excellent	69.40	Excellent	20	Excellent	Excellent
009581	NI2385	MIDDLE BRANCH VERDIGRE CREEK	NE 42	42	large	Cold	REF4	48	Excellent	84.16	Excellent	26	Excellent	Excellent
009578	NP1100	NORTH PLATTE RIVER	West 25 27	27	large	Cold	PER4	36	Fair	65.71	Excellent	20	Excellent	Excellent
009567	WH1065	WHITE RIVER	NW 43	43	mediu	Warm	PER4	32	Poor	73.43	Excellent	18	Excellent	Excellent
009562	LO3171	MIDDLE LOUP RIVER (A)	Sand 44	44	large	Cold	PER4	48	Excellent	71.25	Excellent	28	Excellent	Excellent
010204	MT2142	AOWA CREEK	East 47 271	47	large	Warm	PER4	26	Poor	45.80	Good	10	Fair	Fair
010199	MT1135	WOOD CREEK	East 47 271	47	small	Warm	PER4	26	Poor	55.15	Good	10	Fair	Fair
010178	MP2053	PLATTE RIVER	West 25 27	27	large	Warm	PER4	46	Good	63.54	Good	12	Fair	Fair
010176	MP1051	SILVER CREEK	West 25 27	27	small	Warm	PER4	36	Fair	67.26	Excellent	12	Fair	Fair
010174	SP2019	LODGEPOLE CREEK	West 25 27	25	mediu	Warm	PER4	38	Excellent	68.54	Excellent	8	Fair	Fair
010173	SP2040	LODGEPOLE CREEK	West 25 27	25	small	Warm	PER4	44	Excellent	52.75	Good	8	Fair	Fair
010171	SP1038	PETERSON DITCH	West 25 27	25	large	Warm	PER4	36	Good	42.81	Fair	14	Good	Fair
010170	SP1036	SOUTH PLATTE RIVER (Brule)	West 25 27	25	mediu	Warm	PER4	34	Fair	50.73	Good	10	Fair	Fair
010165	SP1031	SOUTH PLATTE RIVER (Centennial Pa	West 25 27	27	large	Warm	PER4	48	Excellent	65.10	Excellent	12	Fair	Fair
010113	NE3194	SPRING CREEK	East 47 271	47	mediu	Warm	PER4	26	Poor	41.44	Fair	18	Good	Fair
010107	NE2188	YANKEE CREEK	East 47 271	47	mediu	Warm	PER4	30	Fair	41.97	Fair	16	Good	Fair
010094	LP2165	DUCK CREEK	East 47 271	47	mediu	Warm	PER4	32	Fair	42.26	Fair	10	Fair	Fair
010091	LP2162	SAND CREEK	East 47 271	47	large	Warm	PER4	30	Fair	41.46	Fair	12	Fair	Fair
009985	NI3415	UNNAMED TRIB. NIOBRARA RIVER	NW 43	43	small	Warm	PER4	44	Good	66.80	Good	10	Fair	Fair

Table 33. continued.

STORET	NDEQ_ID	STRMNAME	ecoplace	ECOREG	strmsize	coldwarm	FieldRef4	Habscore5	Habuse	ibi8	IBIuse	BugSc	ICluse	Final Rating
009925	RE3113	REPUBLICAN RIVER (F)	West 25 27	25	large	Warm	REF4	50	Excellent	42.01	Fair	16	Good	Fair
009922	RE3154	REPUBLICAN RIVER (E)	West 25 27	27	large	Warm	PER4	44	Good	61.51	Good	12	Fair	Fair
009921	RE3210	RED WILLOW CREEK	West 25 27	27	large	Warm	PER4	34	Fair	42.83	Fair	22	Excellent	Fair
009920	RE2205	PRAIRIE DOG CREEK	West 25 27	27	mediu	Warm	PER4	30	Poor	44.82	Good	12	Fair	Fair
009919	RE2153	REPUBLICAN RIVER (D)	West 25 27	27	large	Warm	PER4	44	Good	39.61	Fair	22	Excellent	Fair
009907	LB2100	ELK CREEK	East 47 271	271	small	Warm	PER4	26	Poor	40.14	Fair	14	Good	Fair
009903	BB1130	MUD CREEK	East 47 271	47	mediu	Warm	PER4	32	Fair	49.21	Good	12	Fair	Fair
009901	BB1120	CUB CREEK	East 47 271	271	small	Warm	PER4	28	Poor	62.82	Excellent	10	Fair	Fair
009813	BB1115	BEAR CREEK	East 47 271	47	small	Warm	PER4	24	Poor	56.05	Good	12	Fair	Fair
009729	RE2151	REPUBLICAN RIVER (B)	West 25 27	27	large	Warm	PER4	30	Poor	41.65	Fair	18	Good	Fair
009721	LO1130	S. BRANCH TIMBER CREEK	West 25 27	27	mediu	Warm	PER4	30	Poor	67.10	Excellent	12	Fair	Fair
009711	RE1175	HICKS CREEK	West 25 27	27	small	Warm	PER4	30	Poor	68.31	Excellent	10	Fair	Fair
009594	WH2049	MONROE CREEK	West 25 27	25	small	Cold	REF4	50	Excellent	41.57	Fair	24	Excellent	Fair
009591	LO2037	TURTLE CREEK	West 25 27	27	large	Warm	PER4	38	Fair	74.14	Excellent	10	Fair	Fair
009573	MP2060	SPRING CREEK	West 25 27	27	mediu	Warm	PER4	40	Good	60.87	Good	12	Fair	Fair
009569	EL1094	UNION CREEK	East 47 271	47	mediu	Warm	PER4	36	Good	44.26	Good	12	Fair	Fair
009564	BB4105	UNNAMED TRIB. TO BIG BLUE RIVER	East 47 271	271	small	Warm	PER4	38	Excellent	58.53	Good	10	Fair	Fair
009555	BB2100	TURKEY CREEK (A)	East 47 271	271	small	Warm	PER4	32	Fair	55.37	Good	10	Fair	Fair
009553	MP2058	NORTH DRY CREEK	West 25 27	27	large	Warm	PER4	36	Fair	46.49	Good	12	Fair	Fair
009552	LP2161	UNNAMED TRIB. LITTLE SALT CREEK	East 47 271	47	mediu	Warm	PER4	36	Good	56.78	Good	10	Fair	Fair
009551	LP2160	NORTH OAK CREEK	East 47 271	47	small	Warm	PER4	28	Poor	62.11	Excellent	12	Fair	Fair
010207	MT2145	BOW CREEK (A)	East 47 271	47	large	Warm	REF4	40	Excellent	44.55	Good			Good
010206	MT2144	BOW CREEK (B)	East 47 271	47	large	Warm	PER4	38	Excellent	48.05	Good	20	Good	Good
010198	MT1134	PIGEON CREEK (B)	East 47 271	47	mediu	Warm	PER4	28	Poor	59.70	Good	24	Excellent	Good
010195	MT1050	UNNAMED TRIB. BLACKBIRD CREEK (A)	East 47 271	47	mediu	Warm	REF4	36	Good	60.46	Excellent	18	Good	Good
010195	MT1050	UNNAMED TRIB. BLACKBIRD CREEK (A)	East 47 271	47	mediu	Warm	REF4	38	Excellent	60.46	Excellent	18	Good	Good
010194	EL4013	SOUTH FORK ELKHORN RIVER	Sand 44	44	large	Warm	PER4	40	Good	57.69	Good	18	Good	Good

Table 33. continued.

STORET	NDEQ_ID	STRMNAME	ecoplace	ECOREG	strmsize	coldwarm	FieldRef4	Habscore5	Habuse	ibi8	IBIuse	BugSc	ICIuse	Final Rating
010192	EL4111	ELKHORN RIVER (D)	East 47 271	47	large	Warm	REF4	38	Excellent	52.08	Good	14	Good	Good
010187	EL2103	BAKER CREEK	East 47 271	47	mediu	Warm	PER4	28	Poor	58.97	Good	26	Excellent	Good
010180	MP2055	PLATTE RIVER (North Channel)	West 25 27	27	large	Warm	PER4	40	Good	61.81	Good	16	Good	Good
010179	MP2054	WOOD RIVER	West 25 27	27	mediu	Warm	REF4	44	Good	48.01	Good	16	Good	Good
010168	SP1034	SOUTH PLATTE RIVER	West 25 27	25	large	Warm	PER4	40	Excellent	48.73	Good			Good
010164	NP3112	NINEMILE CREEK	West 25 27	25	large	Cold	REF4	56	Excellent	59.69	Good	24	Excellent	Good
010163	NP3111	RED WILLOW CREEK	West 25 27	25	large	Cold	PER4	42	Excellent	84.83	Excellent	16	Good	Good
010162	NP3110	NORTH CHANNEL NORTH PLATTE RIVER	West 25 27	25	large	Cold	PER4	36	Good	76.64	Excellent	14	Good	Good
010161	NP2109	UNNAMED TRIB. CEDAR CREEK	West 25 27	25	mediu	Cold	PER4	32	Fair	62.70	Good	14	Good	Good
010159	NP2107	NORTH PLATTE RIVER (South Channne	West 25 27	25	large	Cold	PER4	38	Excellent	74.33	Excellent	16	Good	Good
010155	NP2102	NORTH PLATTE RIVER (North Channel	West 25 27	25	large	Cold	PER4	52	Excellent	61.89	Good	22	Excellent	Good
010154	NP1101	NORTH PLATTE RIVER	West 25 27	25	large	Cold	PER4	36	Good	81.79	Excellent	18	Good	Good
010150	MP2057	PLATTE RIVER	West 25 27	27	large	Warm	PER4	34	Fair	70.73	Excellent	14	Good	Good
010114	NE3195	MUDDY CREEK	East 47 271	47	small	Warm	PER4	26	Poor	57.64	Good	22	Excellent	Good
010112	NE3193	INDIAN CREEK	East 47 271	47	mediu	Warm	REF4	40	Excellent	60.18	Excellent	18	Good	Good
010111	NE3192	LITTLE MUDDY CREEK	East 47 271	47	small	Warm	PER4	24	Poor	66.41	Excellent	18	Good	Good
010110	NE2191	BALLS BRANCH	East 47 271	47	mediu	Warm	PER4	28	Poor	46.48	Good	24	Excellent	Good
010109	NE2190	N. FORK BIG NEMAHA RIVER	East 47 271	47	large	Warm	PER4	28	Poor	51.69	Good	22	Excellent	Good
010108	NE2189	N. FORK BIG NEMAHA RIVER	East 47 271	47	mediu	Warm	PER4	24	Poor	59.80	Good	20	Good	Good
010105	NE2186	UNNAMED TRIB. TURKEY CREEK	East 47 271	47	small	Warm	PER4	30	Fair	72.42	Excellent	20	Good	Good
010104	NE2184	PONY CREEK	East 47 271	47	mediu	Warm	REF4	42	Excellent	46.79	Good	24	Excellent	Good
010103	NE1182	SOUTH CEDAR CREEK	East 47 271	47	mediu	Warm	REF4	38	Excellent	53.28	Good	24	Excellent	Good
010102	NE1181	N. BRANCH WEEPING WATER CREEK	East 47 271	47	mediu	Warm	PER4	34	Good	51.82	Good	26	Excellent	Good
010100	NE1179	HONEY CREEK	East 47 271	47	mediu	Warm	PER4	30	Fair	59.63	Good	20	Good	Good

Table 33. continued.

STORET	NDEQ_ID	STRMNAME	ecoplace	ECOREG	strmsize	coldwarm	FieldRef4	Habscore5	Habuse	ibi8	IBIuse	BugSc	ICluse	Final Rating
010099	NE1176	RAKES CREEK	East 47 271	47	small	Warm	REF4	38	Excellent	57.45	Good	16	Good	Good
010098	LP2169	HICKMAN BRANCH	East 47 271	47	mediu	Warm	PER4	30	Fair	46.81	Good	18	Good	Good
010097	LP2168	NORTH BRANCH	East 47 271	47	small	Warm	PER4	24	Poor	65.33	Excellent	16	Good	Good
010096	LP2167	MILLER BRANCH	East 47 271	47	mediu	Warm	PER4	26	Poor	71.68	Excellent	18	Good	Good
010095	LP2166	MIDDLE CREEK	East 47 271	47	large	Warm	PER4	36	Good	59.81	Good	18	Good	Good
010092	LP2163	OAK CREEK	East 47 271	47	large	Warm	PER4	32	Fair	69.05	Excellent	14	Good	Good
010090	LP2088	MIDDLE CREEK	East 47 271	47	mediu	Warm	PER4	32	Fair	51.82	Good	26	Excellent	Good
010090	LP2088	MIDDLE CREEK	East 47 271	47	mediu	Warm	PER4	34	Good	51.82	Good	26	Excellent	Good
010087	LP1023	PAWNEE CREEK	East 47 271	47	mediu	Warm	PER4	36	Good	44.32	Good	18	Good	Good
009984	NI2371	VERDIGRE CREEK (B)	NE 42	42	large	Warm	REF4	48	Excellent	51.28	Good	28	Excellent	Good
009982	LO4180	MUD CREEK	West 25 27	27	large	Warm	PER4	26	Poor	63.68	Good	14	Good	Good
009981	LO4175	SOUTH LOUP RIVER	West 25 27	27	large	Warm	PER4	44	Good	68.57	Excellent	18	Good	Good
009980	LO3172	MIDDLE LOUP RIVER (C)	West 25 27	27	large	Warm	PER4	42	Good	60.82	Good	16	Good	Good
009979	LO3166	N. FORK DISMAL RIVER (B)	Sand 44	44	large	Cold	PER4	54	Excellent	49.64	Good	20	Good	Good
009926	RE1040	COTTONWOOD CREEK	West 25 27	27	small	Cold	REF4	48	Excellent	64.08	Excellent	14	Good	Good
009926	RE1040	COTTONWOOD CREEK	West 25 27	27	small	Cold	REF4	50	Excellent	64.08	Excellent	14	Good	Good
009917	RE3195	MUDDY CREEK	West 25 27	27	small	Warm	REF4	42	Good	55.67	Good	20	Excellent	Good
009910	BB2101	TURKEY CREEK (B)	East 47 271	271	small	Warm	PER4	32	Fair	43.79	Good	16	Good	Good
009909	LB2110	DRY SANDY CREEK	East 47 271	271	mediu	Warm	PER4	36	Good	51.00	Good	20	Good	Good
009908	LB2105	SPRING CREEK (LB)	East 47 271	271	small	Warm	PER4	30	Fair	52.55	Good	12	Fair	Good
009906	LB1081	LITTLE BLUE RIVER (A)	East 47 271	271	large	Warm	PER4	28	Poor	41.39	Fair	20	Good	Good
009905	LB2080	LITTLE BLUE RIVER (B)	East 47 271	271	large	Warm	REF4	48	Excellent	46.91	Good	22	Excellent	Good
009902	BB4125	PLUM CREEK	East 47 271	271	mediu	Warm	PER4	28	Poor	43.82	Good	24	Excellent	Good
009816	LO2135	CALAMUS RIVER	Sand 44	44	large	Cold	PER4	40	Good	67.78	Excellent	18	Good	Good
009811	LO2085	NORTH LOUP RIVER (B)	Sand 44	44	large	Cold	PER4	44	Good	63.72	Good	26	Excellent	Good
009810	NE2185	LORES BRANCH	East 47 271	47	small	Warm	REF4	36	Good	75.99	Excellent	14	Good	Good
009746	LP1157	DECKER CREEK	East 47 271	47	mediu	Warm	PER4	34	Good	48.13	Good	18	Good	Good
009743	RE3152	REPUBLICAN RIVER (C)	West 25 27	27	large	Warm	PER4	38	Fair	57.73	Good	22	Excellent	Good
009742	NI4393	NIOBRARA RIVER (B)	Sand 44	44	large	Warm	REF4	42	Good	56.59	Good	22	Excellent	Good
009740	SP2042	LODGEPOLE CREEK	West 25 27	25	mediu	Cold	REF4	48	Excellent	74.81	Excellent	16	Good	Good
009730	NP2104	BLUE CREEK	Sand 44	44	large	Cold	PER4	46	Good	55.78	Good	24	Excellent	Good
009728	BB1110	WOLF CREEK	East 47 271	47	small	Warm	PER4	28	Poor	50.39	Good	16	Good	Good

Table 33. continued.

STORET	NDEQ_ID	STRMNAME	ecoplace	ECOREG	strmsize	coldwarm	FieldRef4	Habscore5	Habuse	ibi8	IBIuse	BugSc	ICluse	Final Rating
009725	EL4109	ELKHORN RIVER (B)	Sand 44	44	large	Warm	PER4	32	Poor	74.61	Excellent	20	Good	Good
009724	SP1037	SOUTH PLATTE RIVER (Brule)	West 25 27	25	mediu	Warm	PER4	34	Fair	54.90	Good	16	Good	Good
009723	NI3395	GORDON CREEK	Sand 44	44	large	Cold	PER4	38	Good	58.15	Good	22	Excellent	Good
009719	LO2150	NORTH LOUP RIVER (A)	NE 42	42	large	Cold	REF4	46	Good	77.11	Good	22	Excellent	Good
009718	MT1130	UNNAMED TRIB. BLACKBIRD CREEK (B)	East 47 271	47	mediu	Warm	PER4	30	Fair	51.12	Good	24	Excellent	Good
009718	MT1130	UNNAMED TRIB. BLACKBIRD CREEK (B)	East 47 271	47	mediu	Warm	PER4	36	Good	51.12	Good	24	Excellent	Good
009716	NI3400	UNNAMED TRIB. ROCK CREEK	NW 43	43	mediu	Cold	REF4	48	Excellent	82.93	Excellent	16	Good	Good
009716	NI3400	UNNAMED TRIB. ROCK CREEK	Sand 44	44	mediu	Cold	REF4	46	Good	82.93	Excellent	16	Good	Good
009715	NI3410	SHORT PINE CREEK	NW 43	43	mediu	Cold	REF4	52	Excellent	61.15	Good	22	Excellent	Good
009715	NI3410	SHORT PINE CREEK	Sand 44	44	mediu	Cold	REF4	48	Excellent	61.15	Good	22	Excellent	Good
009712	LB2095	LIBERTY CREEK	East 47 271	271	small	Warm	PER4	32	Fair	58.74	Good	22	Excellent	Good
009709	RE1170	CENTER CREEK	West 25 27	27	mediu	Cold	REF4	48	Excellent	53.88	Good	20	Excellent	Good
009708	LO2160	MUNSON CREEK (A)	West 25 27	27	mediu	Warm	PER4	34	Fair	69.16	Excellent	18	Good	Good
009706	LP1155	UNNAMED TRIB. MIDDLE CREEK	East 47 271	47	mediu	Warm	PER4	26	Poor	53.19	Good	26	Excellent	Good
009706	LP1155	UNNAMED TRIB. MIDDLE CREEK	East 47 271	47	mediu	Warm	PER4	28	Poor	53.19	Good	26	Excellent	Good
009705	NE1178	DUCK CREEK	East 47 271	47	mediu	Warm	PER4	38	Excellent	50.27	Good	22	Excellent	Good
009704	EL1095	FREMONT STORM DRAINAGE CANAL	East 47 271	47	large	Warm	PER4	34	Good	66.20	Excellent	14	Good	Good
009704	EL1095	FREMONT STORM DRAINAGE CANAL	East 47 271	47	large	Warm	PER4	34	Good	66.20	Excellent	14	Good	Good
009702	NP3113	DRY SPOTTEDTAIL CREEK	West 25 27	25	small	Cold	PER4	34	Fair	50.18	Good	20	Excellent	Good
009596	NI4305	PINE CREEK	Sand 44	44	mediu	Cold	PER4	32	Poor	63.04	Good	26	Excellent	Good
009587	RE1150	REPUBLICAN RIVER (A)	West 25 27	27	large	Warm	PER4	48	Excellent	52.28	Good	16	Good	Good
009585	NE2183	RATTLESNAKE CREEK	East 47 271	47	mediu	Warm	REF4	38	Excellent	43.06	Good	26	Excellent	Good
009584	LB2090	BIG SANDY CREEK (A)	East 47 271	271	small	Warm	PER4	30	Fair	49.90	Good	26	Excellent	Good

Table 33. continued.

STORET	NDEQ_ID	STRMNAME	ecoplace	ECOREG	strmsize	coldwarm	FieldRef4	Habscore5	Habuse	ibi8	IBIuse	BugSc	ICluse	Final Rating
009580	MP1050	PLATTE RIVER (SIDE CHANNEL)	West 25 27	27	large	Warm	PER4	40	Good	72.59	Excellent	14	Good	Good
009579	EL4107	ELKHORN RIVER (A)	East 47 271	47	large	Warm	PER4	30	Fair	43.60	Good	16	Good	Good
009577	LO3165	N. FORK DISMAL RIVER (A)	Sand 44	44	large	Cold	REF4	52	Excellent	49.15	Good	24	Excellent	Good
009576	LO2145	BIG CREEK	Sand 44	44	mediu	Cold	REF4	48	Excellent	81.64	Excellent	16	Good	Good
009566	NI2365	UNNAMED TRIB. MERRIMAN CREEK	East 47 271	47	small	Warm	REF4	38	Excellent	62.50	Excellent	20	Good	Good
009564	BB4105	UNNAMED TRIB. TO BIG BLUE RIVER	East 47 271	271	small	Warm	PER4	30	Fair	58.53	Good	10	Fair	Good
009563	LO3170	MIDDLE LOUP RIVER (B)	West 25 27	27	large	Warm	REF4	48	Excellent	54.12	Good	16	Good	Good
009561	LP2158	COTTONWOOD CREEK	East 47 271	47	mediu	Warm	PER4	30	Fair	50.84	Good	18	Good	Good
009560	LP1153	PAWNEE CREEK	East 47 271	47	mediu	Warm	PER4	36	Good	45.71	Good	24	Excellent	Good
009558	EL2101	MIDDLE LOGAN CREEK	East 47 271	47	small	Warm	PER4	26	Poor	44.60	Good	14	Good	Good
009557	MT1131	PIGEON CREEK (A)	East 47 271	47	mediu	Warm	PER4	28	Poor	80.13	Excellent	16	Good	Good
009556	MT1041	TEKAMAHA CREEK (B)	East 47 271	47	large	Warm	PER4	26	Poor	55.32	Good	22	Excellent	Good
010208	MT2146	JORDON CREEK	East 47 271	47	mediu	Warm	PER4	22	Poor	34.81	Poor	16	Good	Poor
010208	MT2146	JORDON CREEK	East 47 271	47	mediu	Warm	PER4	22	Poor	34.81	Poor	16	Good	Poor
010202	MT2140	EAST BOW CREEK	East 47 271	47	large	Warm	PER4	28	Poor	47.88	Good	8	Poor	Poor
010197	MT1133	UNNAMED TRIB. BIG PAPILLION CREEK	East 47 271	47	small	Warm	PER4	22	Poor	73.50	Excellent	4	Poor	Poor
010196	MT1132	WALNUT CREEK	East 47 271	47	small	Warm	PER4	26	Poor	63.07	Excellent	8	Poor	Poor
010193	EL4112	HOLT CREEK	Sand 44	44	small	Warm	PER4	42	Good	38.01	Fair	10	Poor	Poor
010190	EL3106	NORTH FORK ELKHORN RIVER	East 47 271	47	large	Warm	PER4	34	Good	32.91	Poor	18	Good	Poor
010188	EL2104	DOG CREEK	East 47 271	47	mediu	Warm	PER4	32	Fair	34.27	Poor	24	Excellent	Poor
010186	EL2102	UNNAMED TRIB. LOGAN CREEK	East 47 271	47	small	Warm	PER4	34	Good	0.00	Poor	14	Good	Poor
010185	EL2100	LOGAN CREEK	East 47 271	47	large	Warm	PER4	32	Fair	34.77	Poor	20	Good	Poor
010184	EL1099	ELKHORN RIVER (E)	East 47 271	47	large	Warm	PER4	36	Good	46.21	Good	8	Poor	Poor
010183	EL1098	MAPLE CREEK	East 47 271	47	large	Warm	PER4	36	Good	29.93	Poor	8	Poor	Poor
010182	EL1097	DRY CREEK	East 47 271	47	small	Warm	PER4	32	Fair	80.58	Excellent	8	Poor	Poor
010181	EL1096	UNNAMED TRIB. PEBBLE CREEK	East 47 271	47	small	Warm	PER4	28	Poor	0.00	Poor	10	Fair	Poor

Table 33. continued.

STORET	NDEQ_ID	STRMNAME	ecoplace	ECOREG	strmsize	coldwarm	FieldRef4	Habscore5	Habuse	ibi8	IBIuse	BugSc	ICIuse	Final Rating
010177	MP2052	PLATTE RIVER (Issac Walton)	West 25 27	27	large	Warm	PER4	46	Good	63.70	Good	6	Poor	Poor
010172	SP2039	HIGHLINE CANAL	West 25 27	25	mediu	Warm	PER4	26	Poor	0.00	Poor	14	Good	Poor
010167	SP1033	FREMONT SLOUGH (WEST)	Sand 44	44	mediu	Cold	PER4	32	Poor	71.99	Excellent	14	Poor	Poor
010156	NP2103	ASH CREEK	Sand 44	44	small	Warm	PER4	28	Poor	19.43	Poor	16	Good	Poor
010106	NE2187	LONG BRANCH	East 47 271	47	large	Warm	PER4	32	Fair	32.60	Poor	26	Excellent	Poor
010093	LP2164	UNNAMED TRIB. COTTONWOOD CREEK	East 47 271	47	small	Warm	PER4	28	Poor	75.00	Excellent	8	Poor	Poor
010089	LP2062	SALT CREEK	East 47 271	47	large	Warm	PER4	30	Fair	43.60	Good	6	Poor	Poor
010088	LP1156	SHELL CREEK	West 25 27	27	mediu	Warm	PER4	24	Poor	34.43	Poor	14	Good	Poor
010014	NI3425	WILLOW CREEK	Sand 44	44	small	Cold	PER4	44	Good	95.40	Excellent	14	Poor	Poor
009983	NI2390	NIOBRARA RIVER (E)	NE 42	42	large	Warm	PER4	44	Good	51.39	Good	16	Poor	Poor
009978	LO2161	MUNSON CREEK (B)	West 25 27	27	mediu	Warm	PER4	32	Fair	34.72	Poor	20	Excellent	Poor
009918	RE2200	SAPPA CREEK	West 25 27	27	mediu	Warm	PER4	30	Poor	27.71	Poor	16	Good	Poor
009748	NI1238	UNNAMED TRIB. PONCA CREEK	NE 42	42	small	Warm	PER4	48	Excellent	89.01	Excellent	8	Poor	Poor
009714	MT2138	UNNAMED TRIB. SOUTH CREEK	East 47 271	47	small	Warm	PER4	36	Good	0.00	Poor	6	Poor	Poor
009713	LB2091	BIG SANDY CREEK (B)	East 47 271	271	small	Warm	PER4	40	Excellent	42.32	Fair	6	Poor	Poor
009710	RE2161	BEAVER CREEK (B)	West 25 27	27	small	Warm	PER4	22	Poor	33.65	Poor	16	Good	Poor
009707	WH2070	WARBONNET CREEK	NW 43	43	mediu	Cold	PER4	36	Good	32.04	Fair	8	Poor	Poor
009703	NE1177	ERVINE CREEK	East 47 271	47	small	Warm	PER4	34	Good	0.00	Poor	12	Fair	Poor
009583	LP1154	FOUR MILE CREEK	East 47 271	47	large	Warm	PER4	26	Poor	39.31	Poor	14	Good	Poor
009574	LP2159	WAHOO CREEK	East 47 271	47	large	Warm	PER4	28	Poor	32.62	Poor	4	Poor	Poor
009570	EL1093	TRACY CREEK	East 47 271	47	mediu	Warm	PER4	30	Fair	39.55	Poor	14	Good	Poor
009565	NI2370	VERDIGRE CREEK (A)	NE 42	42	large	Warm	PER4	52	Excellent	57.18	Good	18	Poor	Poor
009559	RE1165	EAST PENNY CREEK	West 25 27	27	small	Warm	PER4	26	Poor	19.43	Poor			Poor
009554	RE2160	BEAVER CREEK (A)	West 25 27	27	small	Warm	PER4	20	Poor	28.19	Poor	14	Good	Poor