

ASSESSMENT OF AQUATIC BIOLOGICAL CONDITION USING WY RIVPACS WITH COMPARISONS TO THE WYOMING STREAM INTEGRITY INDEX (WSII)

Eric G. Hargett
Wyoming Department of Environmental Quality
Water Quality Division
122 W. 25th St.
Herschler Building 4-W
Cheyenne, Wyoming 82002

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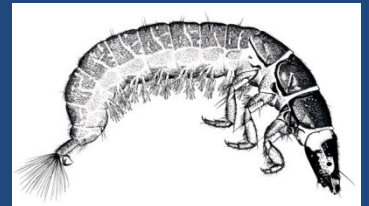


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EXECUTIVE SUMMARY

For over ten years and in accordance with Wyoming's responsibilities under the CWA, the WDEQ/WQD continues to develop effective biological indicators for assessment of designated aquatic life use support of Wyoming's streams and rivers. The benthic-macroinvertebrate based Wyoming River InVertebrate Prediction And Classification System (WY RIVPACS) is one of two biological indicators used by the WDEQ/WQD to evaluate anthropogenic impacts on aquatic communities, assist in making aquatic life designated use-support determinations and evaluate the degree to which changes in management practices are effective at rehabilitating aquatic communities.

The WY RIVPACS is a quantitative multivariate biological model that makes site-specific predictions of the benthic macroinvertebrate fauna expected (E) in the absence of anthropogenic stressors for streams and rivers in Wyoming. Faunal expectations are based on probabilities of reference group membership using several abiotic predictor variables. The ratio (O/E) of the taxa observed in the stream (O) from the expected (E) taxa is a community-level measurement of biological condition. The objective of this project was to redesign the existing WY RIVPACS to improve its accuracy and precision through 1) integration of additional reference sites to improve prediction of E, 2) selection of a new predictor variable suite (from several existing and new candidate predictor variables) to improve prediction of E and 3) use of automated tools that enhance evaluation of model performance. In addition, there was a focused effort to improve commonality in biological condition assessments between WY RIVPACS and WDEQ/WQD's multimetric biological model, the Wyoming Stream Integrity Index (WSII). Commonality was optimized through the use of the same dataset, reference sites, taxonomic resolution, reference group clustering and other methodological factors when constructing both models. This commonality in biological condition assessments between the WY RIVPACS and WSII was then evaluated at both bioregion and state scales.

A total of 1,488 benthic macroinvertebrate samples collected from riffles between 1993 and 2009 were used to redesign the WY RIVPACS. Application of reference and degraded criteria resulted in 475 reference and 165 degraded samples used in model development. A subset of 152 reference samples, that each represented a unique site, was randomly selected for use in model calibration. Thirty-nine of the 475 reference samples were randomly selected and used only for model validation. All samples were taxonomically standardized to Operational Taxonomic Units (OTUs) with a maximum of 300 randomly selected individuals per sample. Over 32,000 possible models based on all possible combinations of predictor variables were evaluated for accuracy, precision and bias. A model that uses eight predictor variables based on nine reference groups was selected that provided the maximum accuracy and precision and best accounted for the natural biological variability among the reference groups. The eight variables used in the prediction of E and ultimately biological condition were longitude, latitude, watershed area, alkalinity and categorical variables for the individual or combined bioregions of the Southern Rockies & Bighorn Mountains, Black Hills, High Valleys & Upper North Platte and Southern Foothills & Laramie Range.

WY RIVPACS is both accurate and precise as the mean and standard deviation (model error) in O/E values between reference sites used in model development (1.02 and 0.169) and validation (0.99 and 0.168) were statistically similar. WY RIVPACS precision (0.169) improved from the previous version (0.174). Temporal variability in O/E values for reference sites was low with a 12% coefficient of variability indicating the model is reasonably robust in light of natural variability in benthic macroinvertebrate assemblages and environmental factors. The model predicted biological condition similarly across all bioregions and accounted for approximately 80% of natural biological variability within the reference dataset. Validation of the model with an independent dataset combined with cross-validation and re-substitution methods along with evaluations of model error, affirmed that the WY RIVPACS is applicable to other datasets, and is not over-fit such that the model is only applicable to the data from which it was developed. Only 4% of the 1,351 samples not used in model calibration or validation fell outside the model's experience, an improvement from the 17% that were outside the

experience of the previous WY RIVPACS. Most samples that fell outside model experience were located on large reservoir-controlled reaches of the Bighorn, North Platte and Shoshone Rivers for which reference conditions have not yet been established within the network of reference sites in Wyoming. WY RIVPACS was accurate in both space and time and precise enough to detect modest alteration in biota associated with anthropogenic stressors. The new WY RIVPACS is also comparable in performance to other RIVPACS-type models developed in the United States and can produce effective assessments of biological condition over a broad ecologically-diverse region like Wyoming.

Both the WY RIVPACS and WSII respond similarly to environmental stressors and produce similar assessments of biological condition at the bioregion and state-scales with the WY RIVPACS being generally more precise. However at the sample-scale, the WSII typically assigns a higher biological condition relative to the WY RIVPACS. Despite efforts to improve commonality between the two models, the fundamental differences in the biological and statistical properties of each model limit comparability and result in systematic differences between the WY RIVPACS and WSII. Indeed, the biological attributes of each model are not ecologically equivalent. WY RIVPACS measures the presence/absence of particular taxa in the community whereas the WSII measures a combination of attributes that describe taxa richness, composition, function and tolerance of the benthic macroinvertebrate community. Therefore, it would be unreasonable to expect both models to always produce similar assessments of biological condition.

Systematic differences between the models are minimized once model output is codified into designated aquatic life use attainment categories (i.e. full-support, indeterminate, partial/non-support). The mean percentage of discrepancies (one model implies 'full-support' whereas the other implies 'partial/non-support') in sample-specific aquatic life use attainment categories between the WY RIVPACS and WSII was only 6% - an improvement from the 15% discrepancies between the previous versions of the WSII and WY RIVPACS. Though small, cases of discrepancy can occur and may reflect actual ecological conditions that were occurring at the time the sample was collected. Therefore, it is important that users weigh the technical merits of each model and understand their outputs within an ecological context to derive inferences on overall biological condition.

The WY RIVPACS is a scientifically defensible tool that provides consistent and accurate assessments of biological condition at varying spatial scales. Use of the WY RIVPACS is advocated in the assessment of overall biological condition, determination of designated aquatic life use-support (in a weight-of-evidence approach) and evaluation of watershed improvement projects as they relate to biological condition. The modeling used to develop the WY RIVPACS was part of an iterative process with the ultimate goal of improving accuracy, precision and applicability. Future redesigns of the WY RIVPACS will inevitably occur as additional data, reference sites and new innovative approaches to predictive model development arise. In the meantime, the WY RIVPACS increases our ability to make better and more conclusive weight-of-evidence decisions on biological condition and designated aquatic life use-support which consequently improves our ability to fulfill Wyoming's obligations under the federal CWA.

INTRODUCTION

The federal Clean Water Act (CWA) §101(a) directs States and tribes to restore and maintain the chemical, physical and biological integrity of the Nation's waters. The current and widely accepted definition of biological integrity is described by Karr and Dudley (1981) as "the capability of supporting and maintaining a balanced, integrated, adaptive community of organisms having a species composition, diversity, and functional organization comparable to that of the natural habitat of the region." Therefore, the biological integrity of surface waters can best be assessed by evaluating the degree to which the resident biota achieve an expected regional threshold that would equate to maintenance of biological integrity. In general, a departure from the expected biological threshold may be assumed to be the result of disturbances from anthropogenic activities.

RIVPACS (River InVertebrate Prediction And Classification System) is a multivariate predictive model that is used to assess the biological integrity or condition of streams and rivers (Clarke et al. 2003; Moss et al. 1987; Wright et al. 1993, 2000). RIVPACS models make site-specific predictions of the benthic macroinvertebrate fauna expected to occur at a stream site in the absence of anthropogenic stressors. Those predictions are based on empirical relationships between individual taxon probabilities of capture (PC) and natural environmental gradients (e.g. latitude, longitude, elevation, watershed area, etc.) that are derived from data collected from a reference site network. The expected number of taxa (E) at a site is estimated as $\sum PC_i$ for a given PC threshold (e.g., 0.0, 0.1, 0.5), where i = each taxon in the region of interest (Hawkins 2006). The observed taxa (O) is that set of taxa with PCs greater than the specified threshold value that were collected in the sample. The deviation of the observed from the expected taxa, is usually measured by the ratio (O/E) of the observed (O) to expected (E) values (Clarke et al. 1996). When the O/E index is expressed in units of taxa richness, it can be a measure of compositional similarity and thus a community-level measure of biological integrity (Hawkins 2006).

Once a novel statistical approach to assess the quality of rivers, RIVPACS models have evolved into widely accepted and standard tools for the assessment of lotic biological condition in Great Britain, Australia and New Zealand over the last twenty years (Joy and Death 2003; Simpson and Norris 2000; Smith et al. 1999; Wright et al. 2000). The applicability of the RIVPACS approach to freshwater systems internationally led to considerable work in the development and application of RIVPACS models in the United States over the last ten years with generally successful results (Carlisle and Hawkins 2008; Hawkins 2006; Hawkins and Carlisle 2001; Hawkins et al. 2000). Wyoming's water quality monitoring and assessment program successfully uses a RIVPACS-type model as a standard tool to assess the biological condition of surface waters, in part, to fulfill requirements under the CWA (Hargett et al. 2007 and 2005).

Developed over five years ago, the Wyoming RIVPACS (WY RIVPACS) was one of the first models used to assess the biological condition of wadeable streams in the United States intermountain west and is comparable in accuracy and precision to other successful RIVPACS models developed in the United States. WY RIVPACS uses high resolution benthic macroinvertebrate data ($PC > 0.5$) and a combination of eleven continuous and categorical environmental variables to measure biological condition (Hargett et al. 2007 and 2005).

This report describes the second version of the WY RIVPACS which builds upon the previous to enhance its use as a standard tool for assessing the biological condition of wadeable streams in Wyoming. The largest dataset (1993-2009) to date, with additional reference and degraded sites since the last WY RIVPACS version, was used to calibrate and validate the current model. Redesign also required the re-evaluation of several existing and new candidate predictor variables to improve the prediction of E and ultimately the measurement of biological condition. There was particular focus to evaluate several categorical and continuous candidate predictor variables that could easily be derived using Geographic Information Systems (GIS). Use of GIS predictors not only makes RIVPACS model development a more inviting endeavor for managers in terms of cost and time for data collection but these data can also be

used as surrogates for field collected variables that may be important in measurements of biological condition but are influenced by human disturbance. Bioregions developed as part of the latest iteration of Wyoming's multimetric (MMI) biological model, the Wyoming Stream Integrity Index (WSII) (Hargett 2011), were also considered as candidate predictor variables. Automated tools recently developed by John Van Sickle of the United States Environmental Protection Agency (USEPA) that evaluate model performance (precision, bias, responsiveness and sensitivity) were used extensively in the calibration and validation of this WY RIVPACS. To improve the commonality in biological condition assessments between WY RIVPACS and the WSII, the same network of reference samples, operational taxonomic units (OTUs) and biological groups derived from cluster analyses during development of the WSII (Hargett 2011) were also used in the new WY RIVPACS. Finally, the degree to which the new WY RIVPACS has improved from the previous version with respect to its accuracy, precision and robustness to accommodate temporal variability in the assessment of biological condition on streams and rivers was evaluated. The approaches used to develop the WY RIVPACS were derived from the latest applied research on RIVPACS-type development and should be transferable to other State and tribal biological monitoring and assessment programs.

There are numerous local, regional and national MMI and to some extent RIVPACS-type biological models (with varying scales) available for the assessment of biological condition of streams and rivers in the United States. The choice of whether an MMI and/or RIVPACS-type indicator should be used to assess biological condition at any scale depends in part on both the biological properties one wishes to measure and the statistical properties of each model (Hawkins 2006). At their most basic function, RIVPACS-type models measure the presence/absence of particular taxa whereas MMIs measure a combination of attributes that describe taxa richness, composition, function and tolerance of the benthic macroinvertebrate community. The technical and ecological merits of each index do not preclude the use of one over the other and for that reason Wyoming uses both the WSII and WY RIVPACS for assessment of biological condition for wadeable streams. Both types of indicators are valuable tools in the assessment of biological condition, though there is a tendency for disagreement (~25% of comparisons) in whether an individual sample was in reference condition (Hawkins 2006). Though at a lower rate than described by Hawkins (2006), such discrepancies also occur between the recently developed WSII and the first version of WY RIVPACS (~15% of comparisons) (Hargett 2011). In this report, the precision, bias and sensitivity of the WSII (Hargett 2011) and WY RIVPACS in the assessment of biological condition was evaluated following methods described by Hawkins (2006) and Ode et al. (2008).

METHODS AND MATERIALS

Study Area

Wyoming is ecologically diverse, with much of this diversity attributable to variability in geology, climate, topography, and other environmental features across the state (Knight, 1994). Wyoming straddles the continental divide and encompasses 251,489 km² (97,100 mi²). Wyoming is characterized by abrupt topographic relief and numerous types of exposed granitic, volcanic, and sedimentary bedrock. Elevation ranges from 939 to 4,207 m (3,081 to 13,802 ft) with a mean of 2,030 m (6,660 ft). Average annual precipitation ranges from 15 to 150 cm (6 to 59 in), which is mostly in the form of rain in the plains regions and snow in the mountain and intermountain basins. Temperature in Wyoming varies widely due to the great topographic relief of the state. For example, mean daily maximum and minimum temperatures for July range from 32°C to <24°C (90°F to <75°F) and 13°C to 0°C (55°F to 32°F), respectively.

Omernik and Gallant (1997) divided Wyoming into seven level III ecoregions: Middle Rockies, Southern Rockies, Northwestern Great Plains, Wyoming Basin, Western High Plains and a few small areas classified into the Snake River Plain and the Wasatch and Uinta Mountains. The Middle Rockies consist of the Black Hills in northeastern Wyoming, the Bighorn range in north-central Wyoming, and the Teton, Absaroka, Gallatin, Wyoming, Salt River, Wind River, Beartooth, and other ranges of northwestern/western Wyoming. The Snake River Plain is situated west of the Teton Range whereas the Wasatch and Uinta Mountains are located in extreme southwest Wyoming. The Laramie, Medicine Bow, and Sierra Madre

ranges of south-central and southeast Wyoming comprise the Southern Rockies. The mountains of Wyoming are characterized by coniferous forest, aspen groves, subalpine meadows, and alpine tundra. The mixed-grass prairie of the Northwestern Great Plains makes up most of the eastern one-third of the state and the short-grass prairie Western High Plains are confined to the southeast corner of Wyoming. Much of the remainder of the state is considered part of the Wyoming Basin, which is a high desert elevated plateau that consists of sagebrush, greasewood, and saltbush shrublands. Adding to the ecological diversity of Wyoming are escarpments of sedimentary and granitic rock scattered throughout the plains and basin regions of the state. Most streams in the mountains are classified as coldwater systems by the Wyoming Department of Environmental Quality-Water Quality Division (WDEQ/WQD) based on fisheries surveys conducted by the Wyoming Game and Fish Department (WGFD) and are assigned a maximum temperature criterion of 20°C (68°F) (WDEQ 2007). Streams in the plains and basin regions are a diverse mixture of coldwater and warmwater systems.

Reference and Test Samples

The WDEQ/WQD collected a total of 1,488 samples between 1993 and 2009 (Figure 1). From this dataset, 475 samples were identified as reference based on whether water chemistry met numeric in-stream aquatic life criteria (WDEQ 2007), and sites met applicable criteria in the evaluation of bed, bank and stream habitat conditions in addition to anthropogenic influence as described in Appendix A. A subset of 152 reference samples, that each represented a unique site, was randomly selected for use in model development (reference calibration). Another subset of 39 reference samples was randomly selected for validation to evaluate whether the model accurately assessed samples of known reference condition (reference validation). The remaining 284 reference samples collected at 115 previously sampled reference sites (repeat reference) were used to evaluate temporal variability in reference site O/E values. The number of revisits to each of the reference sites ranged from one to thirteen, with most sites having at least three revisits.

From the remaining 1,013 non-reference samples, 165 samples (from 114 sites) were identified as degraded and used for model calibration. Degraded sites exceeded one or more numeric in-stream aquatic life criteria (WDEQ 2007); exceeded one or more maximum concentrations levels (MCLs) for nitrate-nitrogen (3.5 mg/L) or total phosphorus (1 mg/L) modified from Stoddard et al. (2005); were documented as possessing unstable bed and banks or habitat degradation; and/or influenced by point-source discharges that exceed in-stream water quality criteria, appreciable flow augmentation or depletion, and/or appreciably affected by urbanization and stormwater discharges. Most degraded sites were located on reaches known to be partially or non-supportive of fisheries and/or other aquatic life uses (WDEQ 2007 and 2010). The remaining 848 samples were tested with the model. Samples designated reference calibration, reference validation, repeat reference, degraded or test were the same designations as samples used in development of the WSII (Hargett 2011).

Macroinvertebrates

Benthic macroinvertebrates were collected from riffles in perennial streams with a Surber sampler (0.09 m² = 1 ft²) and 500-µm mesh. This habitat was selected because it is considered to have the greatest diversity and density of organisms and provides the best measure of overall health of the macroinvertebrate assemblage (Barbour et al., 1999). In the absence of riffles, samples were collected in runs, though these represented a small proportion (<5%) of the total number of samples used in model development. Each sample consisted of a composite of eight Surber samples collected randomly along a 30.5 m (100 ft) maximum length of riffle or run. Samples were collected from downstream to upstream to avoid habitat disruption, placed in polyethylene bottles and preserved in 10% Formalin, 99% Isopropanol or 99% Ethanol. Sample processing followed methods described in WDEQ (2004) and included a 500-organism fixed-count subsampling procedure followed by removal of large and rare organisms. All samples were collected during baseflow conditions and generally in microhabitats that possessed sufficient depth to remain submerged during periods of low flow. Repeat samples for a given site were collected from the riffle or run identified during the initial monitoring of that site and generally within one week of the original sample date. Montane streams were sampled from August 1 to October 31, whereas plains and basin streams generally were sampled from July 15 to October

Figure 1- Location of reference (black circles) and non-reference (white circles) sites sampled from 1993 to 2009, in relation to major perennial streams and counties in Wyoming.

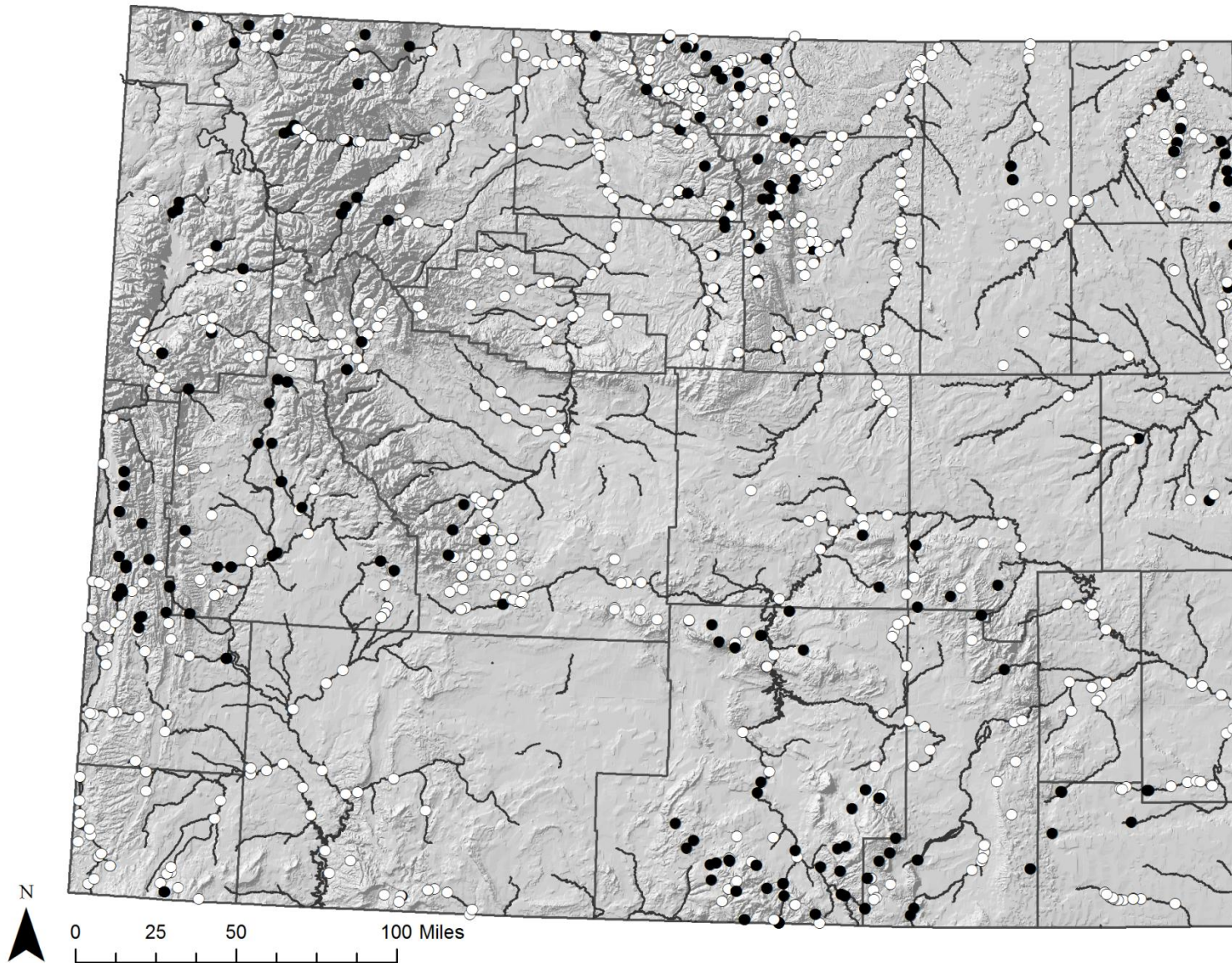
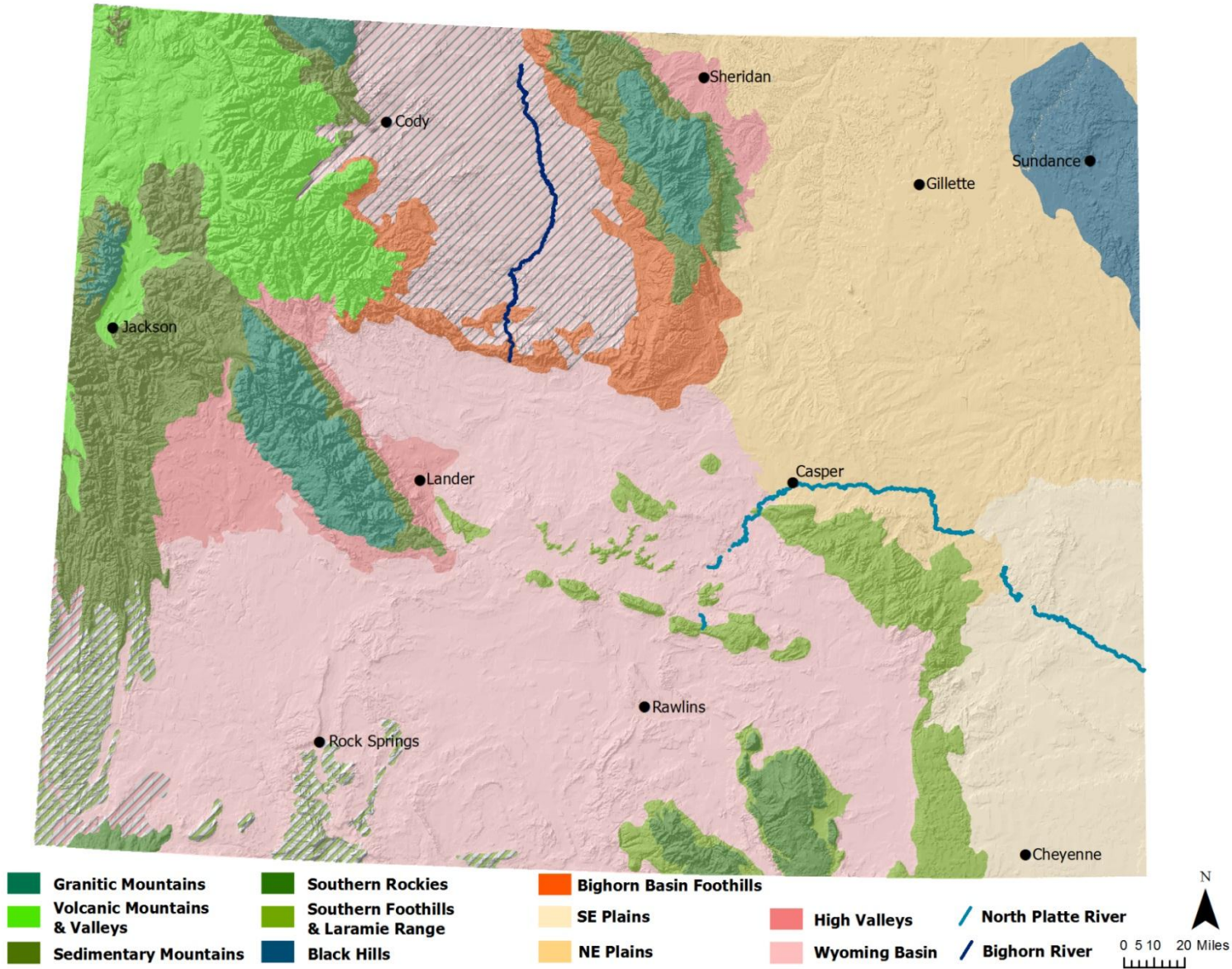


Figure 2 – Wyoming bioregions, large river segments and selected municipalities (Hargett 2011). Reference data are not available or limited for cross-hatched areas though are assumed to have similarities to the bioregion of the same color.



31, whereas plains and basin streams generally were sampled from July 15 to October 31 to correspond with the period of baseflow conditions. Macroinvertebrate data were reported as raw taxa counts and identified to the lowest taxonomic level practical (usually genus) (WDEQ 2004). To ensure consistent taxonomic resolution among samples and to increase commonality in methods used to develop the WY RIVPACS and WSII, data were aggregated to operational taxonomic units (OTUs) as described by Hawkins et al., (2000). A computer generated subsample of 300 randomly selected individuals was extracted for each sample used to calibrate the WY RIVPACS model based on recommendations from Ostermiller and Hawkins (2004).

Water Quality, Climate and Landscape Characterization

Water quality data (pH, temperature, sulfate, total phosphorus, nitrate-nitrogen, total Kjeldahl nitrogen, total nitrogen, alkalinity, hardness, total suspended solids, turbidity, chloride, dissolved oxygen, and conductivity) associated with each macroinvertebrate sample were collected at or within the vicinity of the riffle or run sampled for macroinvertebrates and prior to macroinvertebrate sampling to minimize contamination from disturbance of the sample area. Water quality data were measured on the date of each macroinvertebrate sample collection. ArcGIS® (Version 10) and Spatial Analyst® (Version 10) were used to delineate and calculate watershed area (m²) and determine elevation (m) from 1:24,000 United States Geological Survey (USGS) DRG-E topographic maps. Eight-hundred meter (grid size) normalized mean, maximum and minimum values of daily air temperature and annual precipitation from 1971 to 2000 were obtained from Oregon State University's PRISM database and analyzed using ArcGIS® at the sample scale. Latitude and longitude coordinates were obtained in decimal degrees at each sample site with handheld global positioning systems (GPS) (WGS 1984 datum). Samples were assigned to one of seven ecoregion classifications as described previously and classified as located within one of Wyoming's eleven bioregions (Figure 2) (Hargett 2011). Primary contributing geology for each sample was identified from a 1:500,000 geological bedrock map of Wyoming (USGS 1994). Chemical and physical weathering rates and rock nutrient content (either phosphorus, sulfate or nitrate) of geological formations within a sample's watershed were developed based on the 1:500,000 geological bedrock map (J.R. Olson, Utah State University, unpublished data). Chemical activity of geological formations was assigned an ordinal ranking from low activity (1: granitics, gneiss) to high activity (5: limestone, dolomite). Likewise, physical activity of rock formations was assigned an ordinal ranking from low activity (1: granitics, gneiss, limestone) to high activity (5: siltstone, shale). Rock nutrient content was classified into one of three ranked (ordinal) categories that ranged from low (1) activity (granitics and gneiss with nearly no nutrient content) to high (3) activity (phosphate and gypsum). Mean, majority and maximum index values for chemical, physical and nutrient activity were calculated with ArcGIS® and Spatial Analyst® of the distribution of geology classes in the watershed. A variety of physical data was collected at each site, however these data were not used in development of the WY RIVPACS as they had the potential to be influenced by anthropogenic stressors.

Model Construction

A. Data Analysis

Environmental variables were evaluated for normality and either square-root (count values), $\log_{10}(X+1)$ (values less than 1), arcsin (proportional values) or \log_{10} (other) as necessary. PC-ORD (Version 5.32) (McCune and Medford 2006), STATISTICA (Version 10) (StatSoft 2011) and modified versions of the ALLSUBSETS (Version 4.1) and interval/equivalence R® script subroutines, developed by John Van Sickle with the USEPA, were used for all statistical analyses.

B. Classification of Reference Samples

The Sørensen (Bray-Curtis) similarity index was used to measure the similarity in presence/absence of taxa between all pairs of reference site samples. Rare taxa, defined as taxa that were collected at ten or fewer sites within the reference dataset, were excluded from the classification analysis. The threshold of ten sites was found to best minimize statistical 'noise' while maintaining taxonomic resolution in the data. A flexible hierarchical unweighted pair-group average (UPGMA) agglomerative clustering method with $\beta = -0.6$ was then used to cluster samples based on these similarities.

C. Prediction of Class Membership

Once reference classification groups were identified from the cluster analysis, multiple discriminate function analyses (DFA) were used to determine which environmental variables were most strongly associated with group membership. Candidate predictor variables included: mean and majority geological chemical activity, mean and majority geological physical activity, mean and majority geological nutrient activity, primary contributing bedrock geology, water chemistry variables (alkalinity and hardness), level III ecoregions, Wyoming bioregions and their combinations, latitude, longitude, elevation, watershed area, mean daily minimum and maximum air temperature and mean annual precipitation. Over 32,000 discriminant models based on all possible combinations of 15 or fewer candidate predictor variables were generated. The ten best performing models for each of 1st through 15th –order (candidate predictors) discriminant models for each unique suite of 15 candidate predictor variables were evaluated. Measures used to evaluate performance of each model included the mean, standard deviation and root mean square error of O/E values derived from reference calibration samples.

D. Estimating Probabilities of Capture, E and O/E

Site-specific probabilities of capture (PC) were estimated as the frequencies of occurrence of taxa observed within each reference group weighted by the DFA-derived probabilities that a site was a member of each reference group. The number of PC values ≥ 0.5 were summed to estimate the number of expected (E) taxa in each sample. Use of PC ≥ 0.5 results is a more precise index than PC ≥ 0 (Hawkins et al. 2006 and 2000, Ostermiller and Hawkins 2004, Van Sickle et al. 2005). O/E was estimated as the ratio of the observed (O) to the number of predicted taxa (E).

E. Model Validation and Responsiveness

The accuracy and precision of each predictive model was evaluated by applying it to both the reference calibration dataset and the independent reference validation dataset. Model accuracy and precision were evaluated by estimating the standard deviation of O/E values in calibration and validation datasets and by determining how well O was correlated with E. The slope of the regression of O on E should be near 1 for RIVPACS models with good accuracy (Hawkins et al. 2000, Van Sickle et al. 2005). Likewise, the scatter of points along the regression line (evaluated as the coefficient of determination, r^2) should be small for a model with good precision. Hawkins (2006), Hawkins et al. (2000) and Van Sickle et al. (2005) found that the best performing models generally have reference site O/E standard deviations < 0.20 and account for a significant amount of the variation in O among reference sites.

To further evaluate the precision of the predictive model, a null model and estimates of the standard deviation expected for replicate reference site samples were constructed following the methods of Van Sickle et al. (2005). Together, the null model and replicate sample standard deviations estimate the minimum and maximum levels of precision, respectively, that is theoretically attainable by any RIVPACS model for the given reference calibration dataset (Van Sickle et al. 2005). Comparison of the predictive model's precision with these minimum and maximum levels of precision provide context regarding how well the model performs relative to its possible performance.

Inferences on whether a predictive model is overfit was evaluated with both cross-validation and re-substitution methods among the best performing 1st through 15th –order models. Cross-validation involves multiple iterations of partitioning the reference calibration data into two complementary subsets, performing the analysis on the first subset (training set) and validating the analysis on the second subset (validation set) to draw inferences on the accuracy and precision of each model. The training and validation sets must cross-over in successive rounds such that each data point has a chance of being validated. Re-substitution uses all the reference calibration data to develop the predictor and is used primarily to measure the accuracy of classification on the same set of data used to develop the predictor. As with cross-validation, re-substitution is performed numerous times on a single data set. Overfitting becomes an issue beyond the point where the average cross-validation and re-substitution classification

accuracies plateau as the number of predictor variables increase. In addition, model overfitting becomes more problematic beyond the point where additional predictor variables provide no measurable improvement in model precision (model error).

Systematic model bias was also examined by testing (ANOVA, $\alpha = 0.05$) whether reference sample O/E values were associated with reference classification groups and Wyoming bioregions. Tukey multiple comparison tests were used to identify sets of bioregions that differed in mean reference calibration O/E values.

F. Application to Reference, Degraded and Test Samples

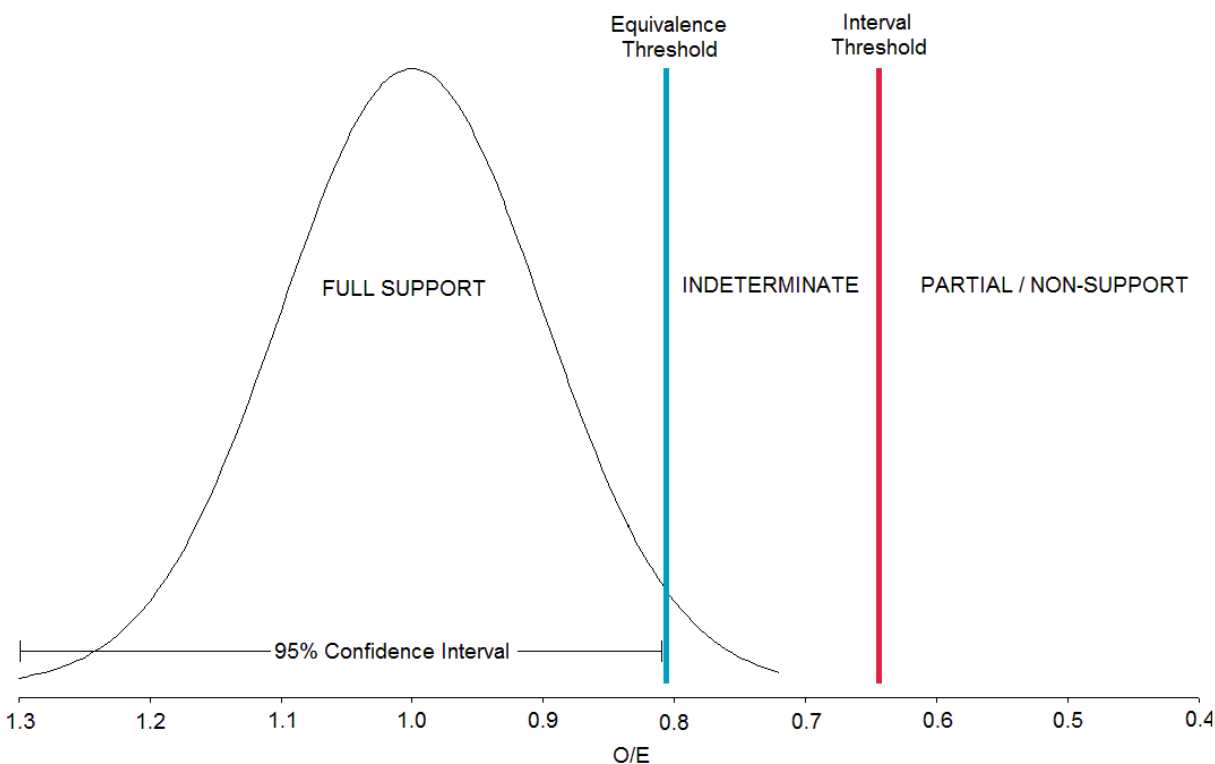
Based on methods described by Clarke et al. (1996), Hawkins et al. (2000) and Moss et al. (1987), all repeat reference, degraded and test samples were evaluated as to whether they were within the experience of the model. These procedures determine if the Mahalanobis squared distances between a test sample and each classification group in multivariate discrimination space are greater than expected as measured by a χ^2 -test based on the predictor variable values. Repeat reference, degraded or test samples that failed this test were not considered in the evaluation of model performance. For those test and degraded samples evaluated with the model, ANOVA ($\alpha = 0.05$) followed by Tukey multiple comparison tests were used to determine whether O/E values differed among Wyoming bioregions.

The 10th and 90th percentiles of reference calibration O/E values were used to infer the percentage of non-reference samples within the 80% 'reference band' of the reference calibration O/E values (Clarke et al. 1996, Ostermiller and Hawkins 2004). Parametric two-sample t-tests were used to determine if significant differences existed between (1) mean reference calibration and reference validation O/E values, (2) mean reference calibration and degraded O/E values and (3) mean reference calibration and test sample O/E values. To examine inter-annual variability in O/E values, the mean coefficient of variation (CV) was calculated for repeat reference samples. Low CVs are equivalent to low temporal variability.

G. Aquatic Life Use Attainment Category Thresholds

WDEQ/WQD is responsible for assessing the attainment of a designated aquatic life use as defined in Wyoming's water quality standards (WDEQ 2007). Assessment of aquatic life use is based on evaluation of biological integrity of waters within the State of Wyoming. WY RIVPACS is used as one of two tools (the other being WSII) to evaluate designated aquatic life use support on wadeable streams in Wyoming. With respect to WY RIVPACS and its application in Wyoming, there are three categories of aquatic life use attainment based on biological integrity: 'full-support', 'indeterminate' and 'partial/non-support'. Development of numeric thresholds for these three narrative categories is based on interval and equivalence tests described by Kilgour et al. (1998) and applied within each of Wyoming's eleven bioregions. This EPA-approved statistical methodology establishes ecologically reasonable numeric thresholds based on the mean, variation and 5th percentile of reference site O/E values within a bioregion (Figure 3). O/E values that fall below the interval threshold are considered significantly different from the 5th percentile of reference site O/E values for that bioregion and are assigned a 'partial/non-support' status. O/E values that are greater than the equivalence threshold are considered statistically similar to O/E values within the 95% confidence interval of the reference site distribution and are thus assigned a 'full-support' status. O/E values that fall between the interval and equivalence thresholds would be considered 'indeterminate' which is not an attainment category, but is rather a designation which would require the use of ancillary information and/or additional data in a weight-of-evidence evaluation to determine a proper narrative assignment (e.g. full or partial/non-support). The advantages of this methodology when stratified by bioregion is that the numeric thresholds are developed from the existing reference data and implicitly account not only for variation among reference site O/E values but also the gradient of reference expectations across bioregions (i.e. reference site quality is not equivalent among all bioregions).

Figure 3 – Illustration of aquatic life use attainment categories derived from interval and equivalence tests (Kilgour et al. 1998). The normal distribution of reference site O/E values is represented by the bell-shaped curve. The equivalence and interval lines represent the 'full-support' and 'partial/non-support' numeric thresholds, respectively.



H. Comparisons, Bias, Sensitivity and Precision between WY RIVPACS and WSII

Methods described by Hawkins (2006) and Ode et al. (2008) were used to compare biological condition assessments and evaluate model precision, bias and sensitivity between the WY RIVPACS and the recently developed WSII. Prior to comparisons, WSII scores for all samples in a given bioregion were standardized by dividing by the mean of reference calibration WSII scores for that bioregion to convert the raw WSII scores to the same units of measure as O/E (the mean rescaled reference calibration WSII scores for each bioregion were similar to 1). Precision was quantified as the standard deviation of reference calibration O/E values and rescaled WSII scores. Bias was assessed as to whether one model under or over-predicted biological condition at the same sites relative to the other model. O/E and rescaled WSII values for test samples were regressed against one another and tested for whether slopes were significantly different from 1 and y-intercepts were significantly different from 0. Coefficients of determination (r^2) were weighted (wr^2) to better quantify over or under-predictions within the context of the regression slopes and dispersion of values along the best fit line. Values of wr^2 were calculated as $|b|*r^2$ for $b \leq 1$ and $|b|^{-1}*r^2$ for $b > 1$ where b is the slope of the regression. Paired t-tests were used to evaluate bias between O/E values and rescaled WSII scores. Evaluation of model bias using r^2 or wr^2 and testing for significant differences between a slope of 1 and an intercept of 0 is quite common. However, these measures assume perfect linear relationships and are over-sensitive to high extreme values and insensitive to additive or proportional differences between models. To supplement the use of these commonly examined statistics, model bias was also evaluated with two additional methods (Nash-Sutcliffe efficiency and relative efficiency) each developed to evaluate different aspects of model bias. These two methods have been used to evaluate bias in hydrologic models, though are generally applicable to any statistical model. Nash-Sutcliffe efficiency (NSE) is a normalized statistic that determines the relative magnitude of the overall residual variance (noise) compared to the actual data

variance (Nash and Sutcliffe 1970). NSE ranges from $-\infty$ to 1.0, with NSE=1 the optimal value. Values between 0.0 and 1.0 are ideal with values farther from 0.0 indicative of increased model bias. NSE is a suitable measure to evaluate model bias particularly at extreme high and low data values. To evaluate model bias specifically within the mid-range of values, the relative efficiency (d_{rel}) was used (Krause et al. 2005). The absolute differences between extreme high and low values are reduced while enhancing the sensitivity at mid-range values with d_{rel} . With d_{rel} values of 1.0 indicate no model bias (range: 0 to 1.0), with values less than one suggestive of model under or over prediction within the mid-range of biological condition. Sensitivity was measured as the proportion of test samples assessed as 'partial/non-support' or 'full-support' by each model using their respective aquatic life use attainment category thresholds. Binomial tests were used for samples with discrepancies in aquatic life use narrative determinations to determine if both models were equally likely to assign 'partial/non-support' or 'full-support' ratings. Because the WSII is a composite of several bioregion-specific indices each with different reference expectations, comparisons of model bias, precision and sensitivity between the WSII and WY RIVPACS was evaluated for each bioregion.

RESULTS

Site Classification

Three-hundred sixty-four OTUs were identified from the 1,488 samples used in the calibration, validation and evaluation of the WY RIVPACS (Appendix B). Two-hundred fifty-eight OTUs were identified from reference calibration samples of which 128 OTUs occurred at 10 or more reference calibration samples and were included in the cluster analysis.

Nine reference groups were derived from the cluster analysis of reference calibration samples (Figure 4). Percent chaining of the cluster analysis was low (1.03). All reference groups contained a minimum of five reference calibration samples. Reference groups had strong similarities to those used in the development of the new WSII and associated bioregions. Generally, samples from upper-elevation montane regions (groups 1-4) were distinct from those from the plains, high elevation desert and low-elevation foothills and mountain ranges of eastern and central Wyoming (groups 5-9) (Figure 4). Reference calibration samples from the NE Plains, SE Plains and Wyoming Basin bioregions tended to fall in either groups 8 or 9. Samples from the Southern Foothills & Laramie Range bioregion were distributed among groups 5, 6 and 8 with Black Hills bioregion samples confined to groups 6 and 8. Group 5 contained all reference calibration samples from the Bighorn Basin Foothills bioregion. Regional structuring of samples from the High Valleys bioregion, an ecological transition between the mountains and high desert basins, was less pronounced and distributed among groups 5, 7 and 8. Samples from streams in the Sedimentary Mountains (e.g. Gros Ventre and Wyoming Range) bioregion were largely confined to group 1 with reference samples at lower elevations represented in group 4. Reference calibration samples from the Absaroka and Gallatin mountains that comprise the Volcanic Mountains & Valleys bioregion were situated in groups 3 and 4, with lower elevation samples represented in the latter group. Lastly, group 2 contained reference calibration samples from the Granitic Mountain (e.g. mid to upper-elevation Bighorn and Wind River mountains) and Southern Rockies (e.g. mid to upper-elevation Medicine Bow and Sierra Madre mountains) bioregions.

All Possible Models and Final Predictor Variables

Evaluation of the mean, standard deviation and root mean square of O/E values combined with output from cross-validation and re-substitution on the best performing 1st through 15th -order models (from a possible 32,000+ models) revealed that any model between 7th and 10th order generally provided the greatest accuracy and precision in the prediction of reference group membership without being overfit (Figures 5 and 6). From an evaluation of the best performing 7th through 10th order models, an 8th order was selected that provided maximum accuracy and precision and best accounted for the natural variability in taxonomic composition among the nine reference groups (Table 1). Those variables most important in discriminating between reference groups were longitude, latitude, watershed area, alkalinity and categorical dummy variables (0 or 1) for the individual or combined bioregions of Southern Rockies &

Bighorn Mountains, Black Hills, High Valleys & Upper North Platte and Southern Foothills & Laramie Range (Figures 7-9). Other environmental variables were less important in distinguishing reference groups. Reference group membership was strongly influenced by longitude, watershed area and whether the sample was collected in the Southern Rockies & Bighorn Mountain region. These strong influences correspond to considerable variability in these predictors across the nine reference groups (Figures 7 and 8). This implies that factors associated with gradient, climate, elevation, flow regime, and geology strongly influence the distribution of benthic macroinvertebrate taxa.

Table 1 – Predictor variables (with corresponding F-values) used in the predictive model.

Longitude	19.66
Log watershed area	13.57
Southern Rockies & Bighorn Mountains	11.21
Black Hills	8.66
Log alkalinity	7.91
High Valleys & Upper North Platte	6.98
Latitude	6.61
Southern Foothills & Laramie Range	6.18

Predictive Model Validation

O/E values for both the reference calibration ($\chi^2 = 7.43$, $P = 0.19$) and reference validation ($\chi^2 = 0.32$, $P = 0.57$) datasets did not show any statistically significant departure from normal distributions based on goodness of fit tests. Predicted values of E were similar to values of O for both reference calibration ($r^2 = 0.72$, $P < 0.001$) and reference validation ($r^2 = 0.67$, $P < 0.001$) datasets (Figure 10). The mean and standard deviation of reference calibration O/E values were 1.02 and 0.169, respectively (Table 2). The mean and standard deviation of reference validation O/E values were similar to calibration values, 0.99 and 0.168, respectively (Table 2). Slopes of the regressions between O and E for calibration (1.07) and validation (0.84) datasets were not significantly different from 1 ($t = 1.98$, $P = 0.10$) (Figure 10). Mean O/E values for reference calibration and validation datasets were not significantly different from one another ($t = 0.77$, $P = 0.44$) (Figure 11). The model may slightly under-predict E for reference groups 2 and 3 and slightly over-predict E for reference group 9 though there was no evidence that reference calibration O/E values varied significantly among reference groups ($F = 1.65$, $P = 0.12$) (Figure 12).

Figure 4 – UPGMA cluster analysis dendrogram that illustrates the nine biologically similar groups derived from the reference calibration dataset. Numbers at the bottom of the dendrogram refer to unique sample identifiers.

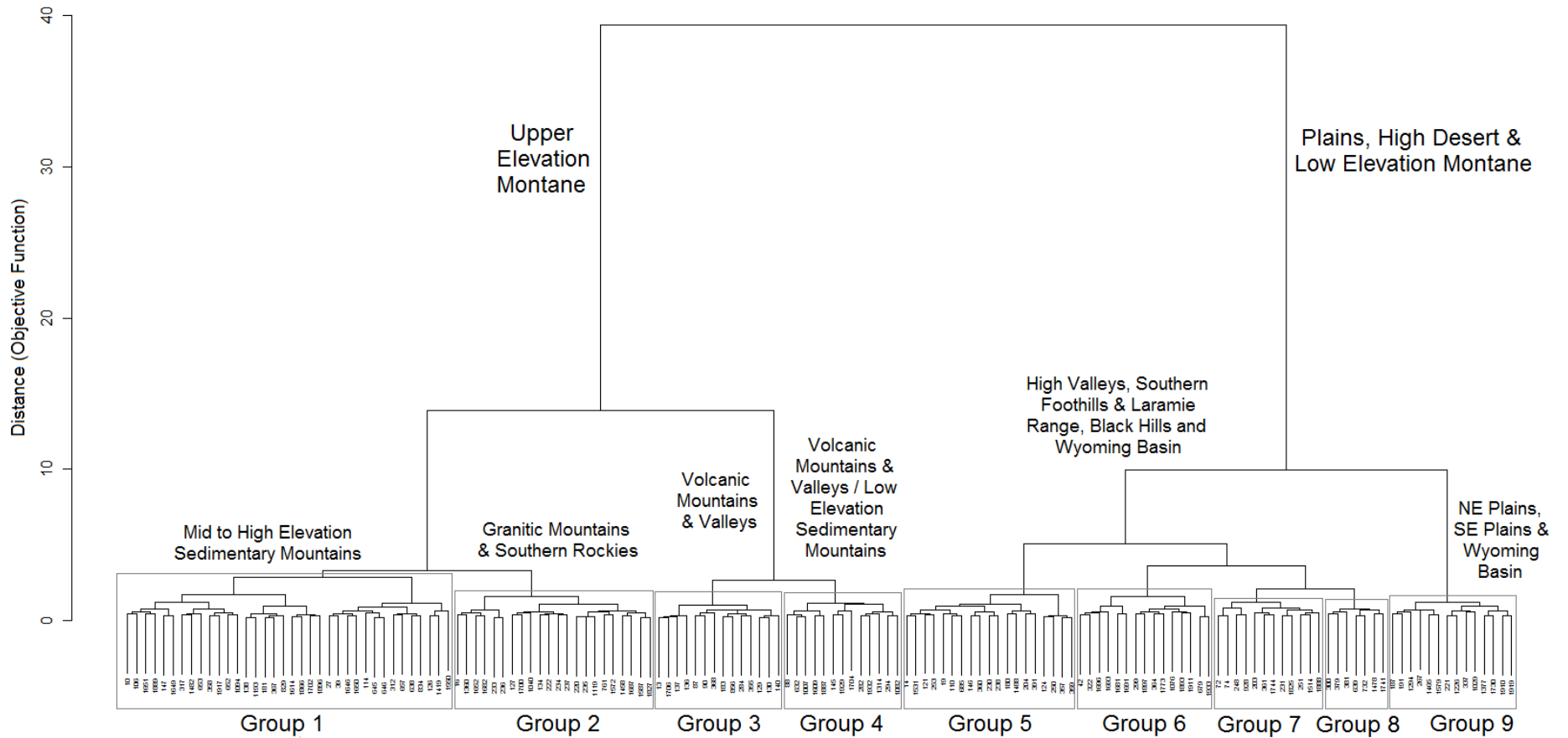


Figure 5- Model error, random sampling error and the associated null model among the best performing 1st through 15th – order models derived from the reference calibration dataset. The null model represents the maximum possible error whereas estimates of random sampling error equate to the conceptual lowest possible error. The black solid line represents a best-fit relationship.

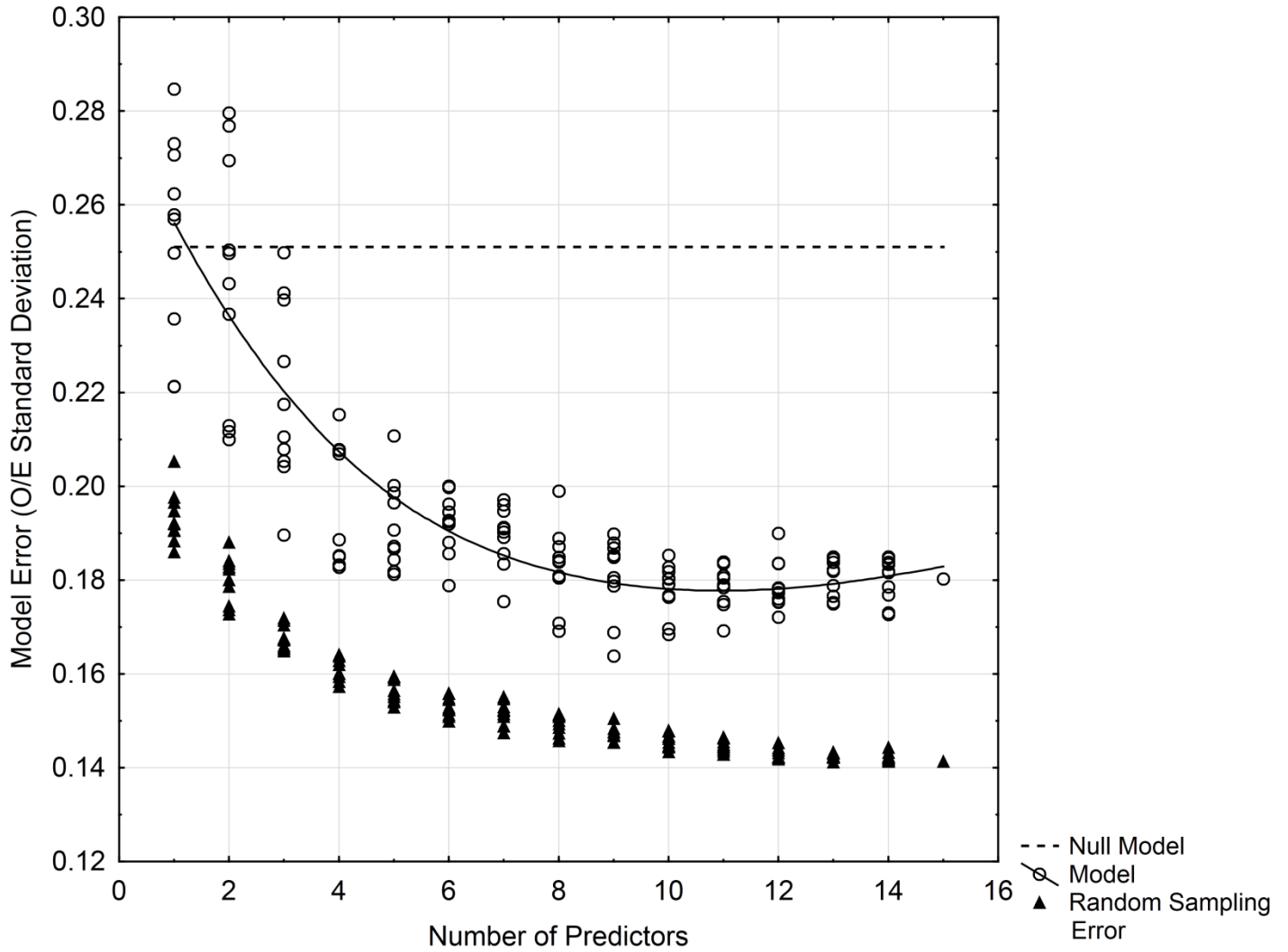
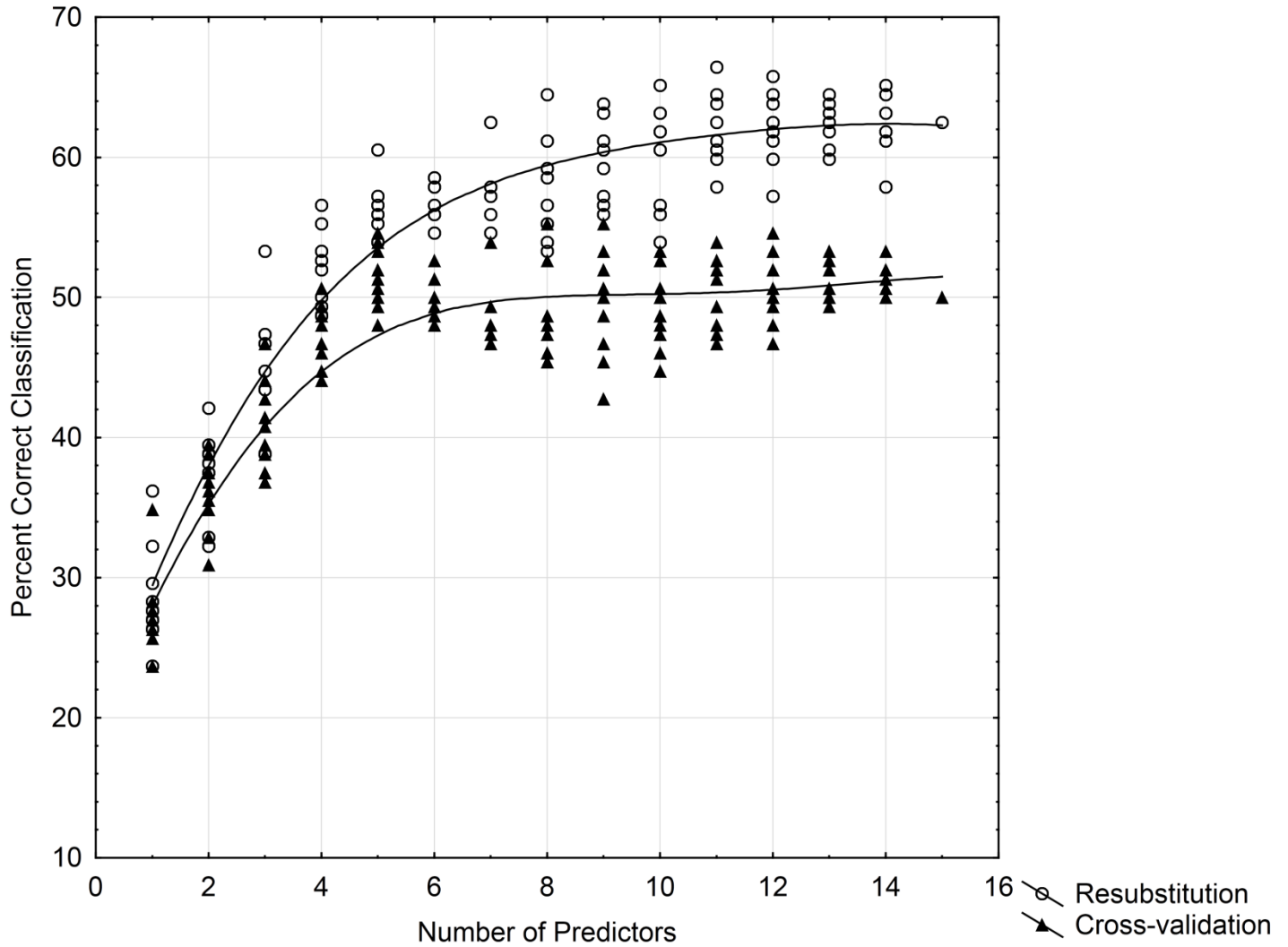


Figure 6 – Relationship between reference group classification accuracy and the number of predictor variables among the best performing 1st through 15th –order models derived from the reference calibration dataset. Percent correct classification was calculated with cross-validation and re-substitution methods. Black solid lines represent best-fit relationships.



This indicates the model was unbiased and predicted similarly among reference groups. Likewise, reference calibration O/E values were not significantly different ($F = 1.72$, $P = 0.08$) among bioregions, though were lowest in the Bighorn Basin Foothills and NE Plains (Table 3). The standard deviation of reference calibration O/E values (0.169) was marginally larger than the random sampling error of 0.149 (theoretical best model) but appreciably less than that for the null model (0.251). These results indicate the predictive model accounted for a sizeable proportion of the natural variability in O within the reference calibration dataset.

Table 2 – Means, standard deviations, percentiles and minimum and maximum O/E values for reference, test and degraded samples.

	Mean	SD	10th	25th	75th	90th	Min	Max
Reference calibration (N=152)	1.02	0.169	0.80	0.91	1.15	1.24	0.54	1.43
Reference validation (N=39)	0.99	0.168	0.78	0.85	1.08	1.22	0.61	1.33
Repeat reference samples (N=284)	0.92	0.195	0.64	0.81	1.07	1.15	0.34	1.41
Test (N=848)	0.76	0.268	0.41	0.58	0.96	1.10	0.00	1.49
Degraded (N=165)	0.51	0.256	0.15	0.34	0.70	0.84	0.00	1.16

Temporal Variability in O/E Values

The coefficient of variation (CV) of O/E values for repeat reference samples ranged from 0 to 0.532 with a mean of 0.117, implying that actual sampling error was less than that implied by the estimated replicate sample standard deviation of 0.149. This suggests that the model accounts for a much larger proportion (approximately 80%) of the natural variability in O within the reference calibration dataset. The low mean actual sampling error also suggests the WY RIVPACS is temporally stable with minimal inter-annual variation and able to adequately discern site to site differences.

O/E Values of Test and Degraded Samples

Mean test sample O/E values (0.76) were significantly lower than reference calibration O/E values ($t = 11.60$, $P < 0.001$) (Table 2, Figure 11). Mean O/E values for known degraded test samples (0.51) were also significantly lower than mean O/E values for reference calibration samples ($t = 20.99$, $P < 0.001$) (Table 2, Figure 11). Mean test sample O/E values varied by 0.38 O/E units among Wyoming bioregions ($F = 15.23$, $P < 0.001$) with larger O/E values occurring in streams within the Granitic Mountains and Volcanic Mountains & Valleys bioregions (Table 3). In contrast, the lowest O/E values for test samples occurred in the NE Plains bioregion (Table 3). Mean degraded sample O/E values were variable though not significantly different among bioregions ($F = 1.78$, $P = 0.07$) implying that no one bioregion had more severely degraded streams than another (Figure 13). Of the 806 test samples within the model's experience, 56% ($n = 447$) fell outside the 10th (0.80) and 90th (1.24) percentiles of reference calibration O/E values. Of these 447 'impaired' test samples, 433 had O/E values below the 10th percentile and only 14 samples were above the 90th percentile. Similarly, of the 163 degraded samples within the model's experience, 88% ($n = 144$) and 4% ($n = 7$) fell outside the 10th and 90th percentiles of reference calibration O/E values, respectively.

Samples Outside the Experience of the Model

Fifty-four (4%) of the 1,351 combined repeat reference, test and degraded samples fell outside the experience of the model and could not be assessed accurately. The majority ($n = 44$) of the 54 samples that fell outside model experience were test or degraded samples. Approximately 60% of these test and degraded samples were located on large reservoir-controlled reaches of the Bighorn, North Platte and Shoshone Rivers. On average, samples that fell outside the experience of the model exhibited higher concentrations of alkalinity (mean = 199 mg/L, $t = 4.37$, $P < 0.001$) and larger watershed areas (mean = 1,357 km², $t = 7.14$, $P < 0.001$) relative to samples within model experience.

Figure 7 – Box-whisker plots that illustrate variation in the four continuous predictor variables between the nine biological reference groups.

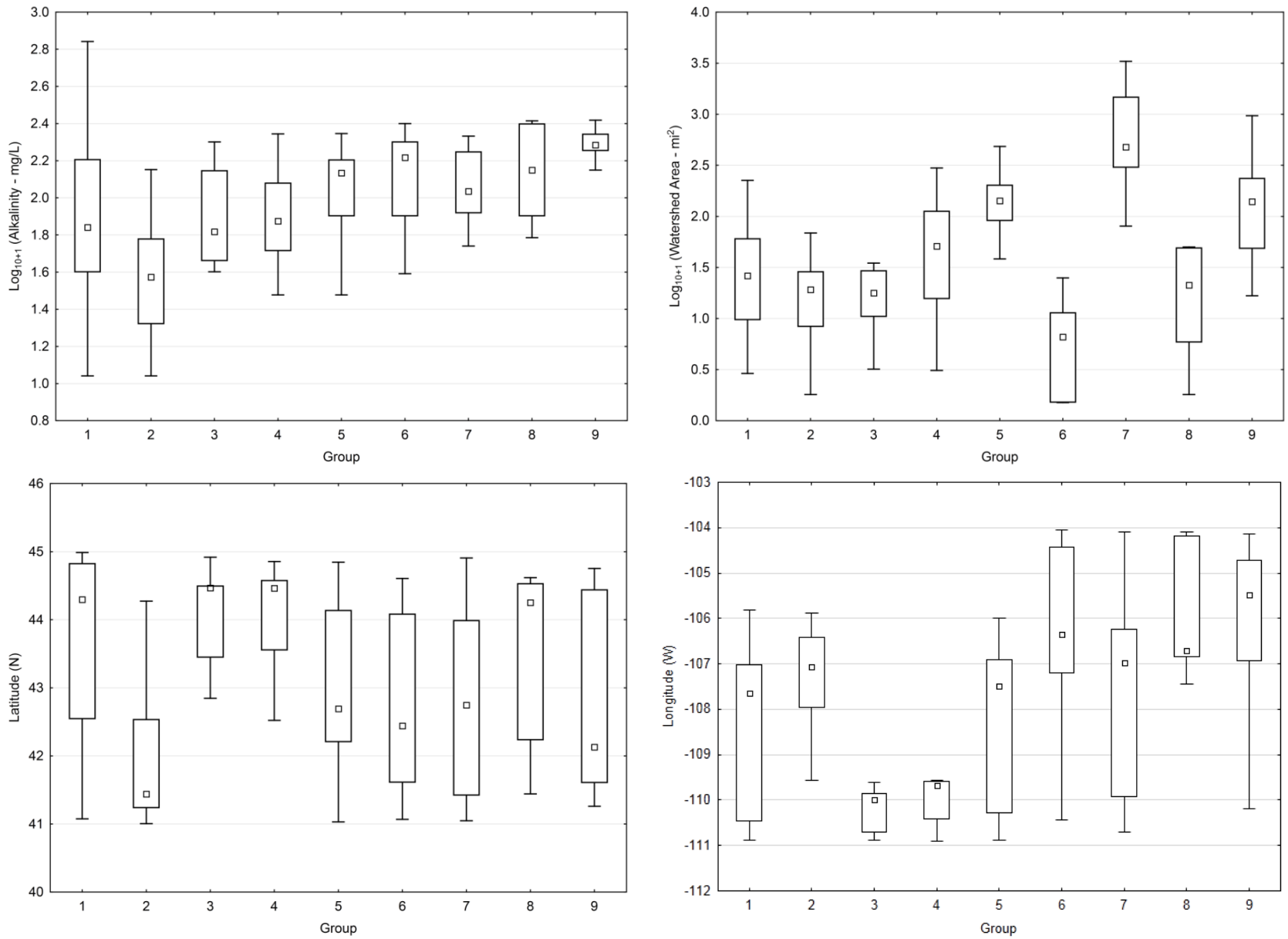


Figure 8 – Histograms that illustrate the variation in the four categorical predictor variables between the nine biological reference groups.

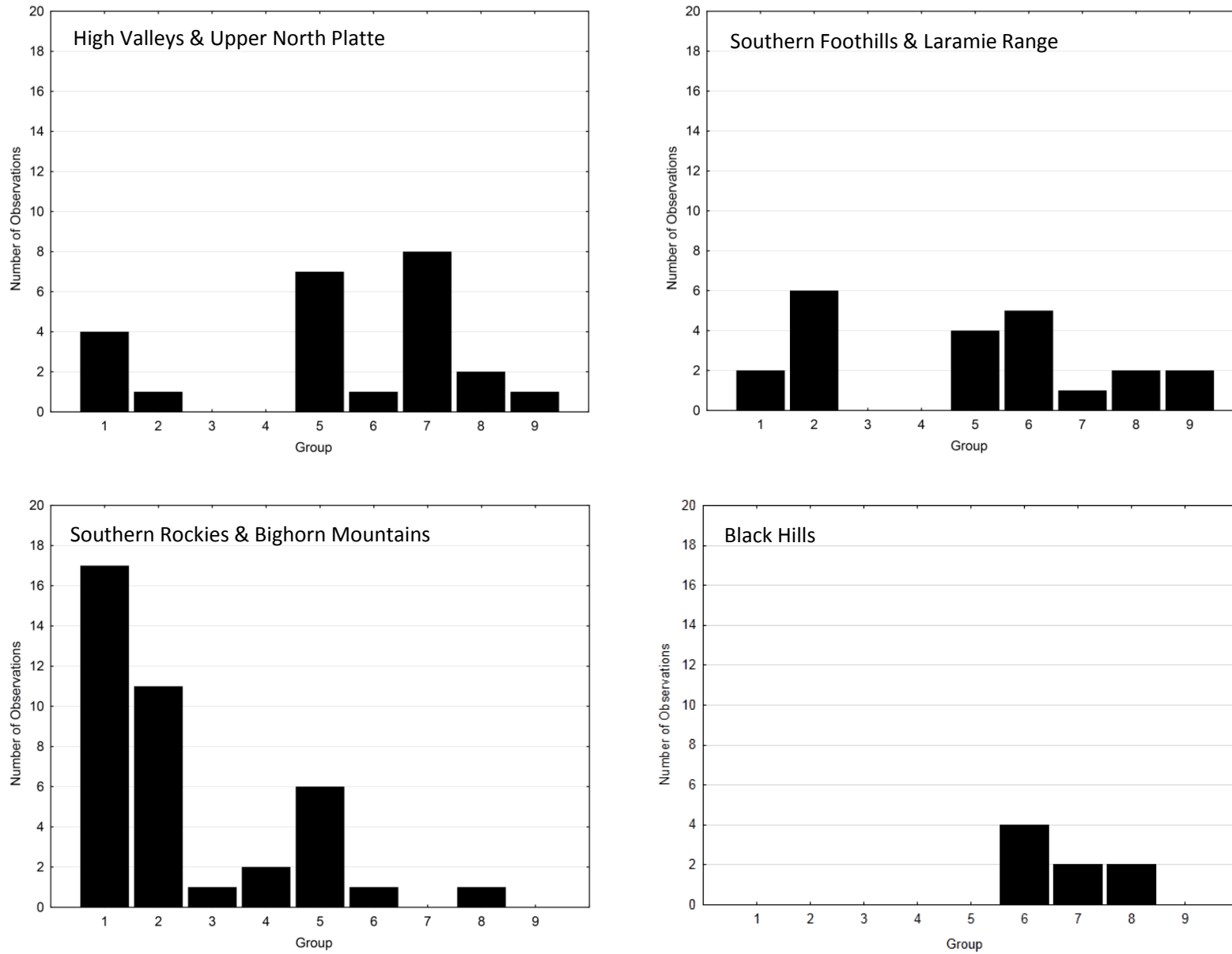


Figure 9 – Relative geographic extent of WY RIVPACS categorical predictors with selected municipalities.

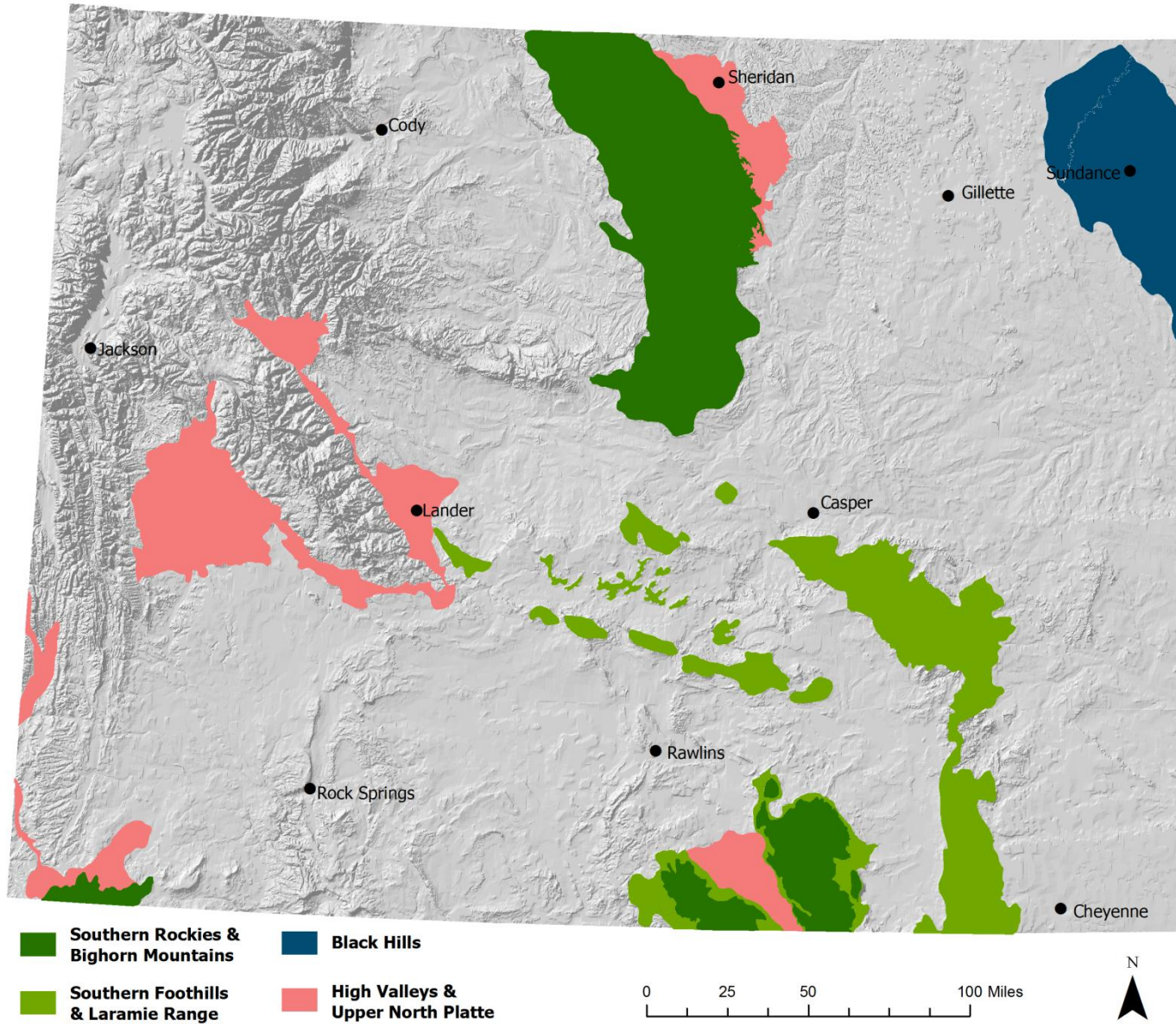


Figure 10 – Relationship between observed (O) and expected (E) OTU richness for reference calibration (top) and reference validation (bottom) samples.

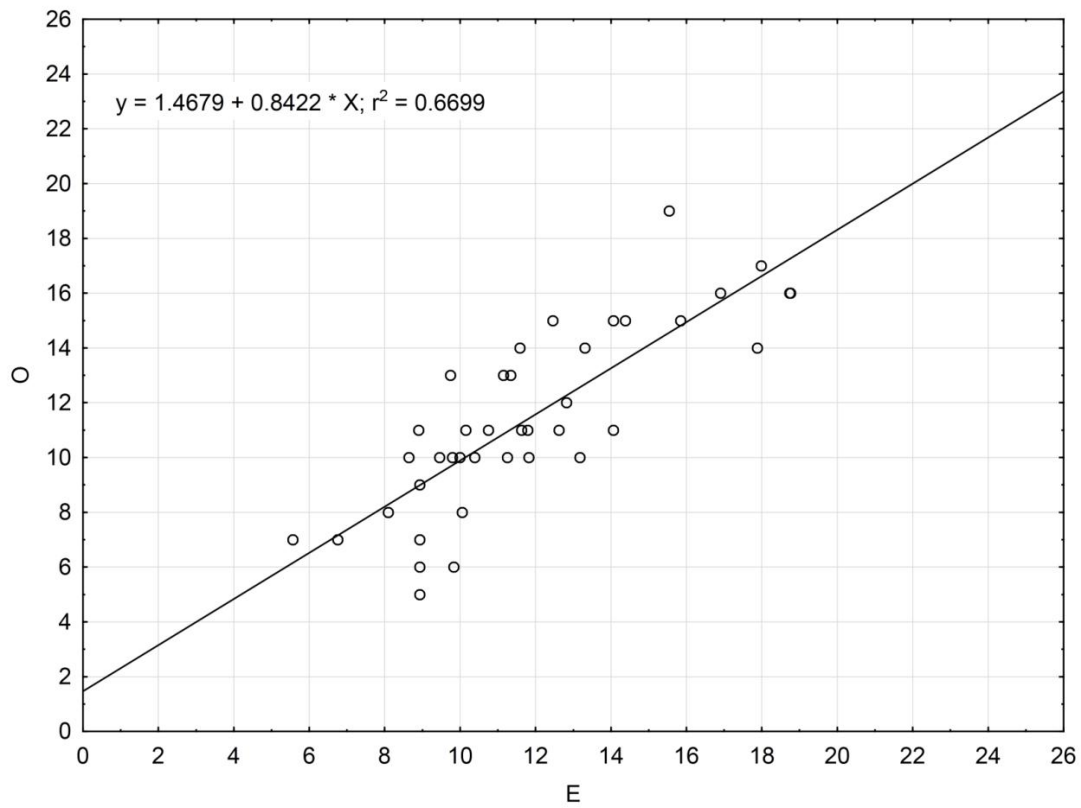
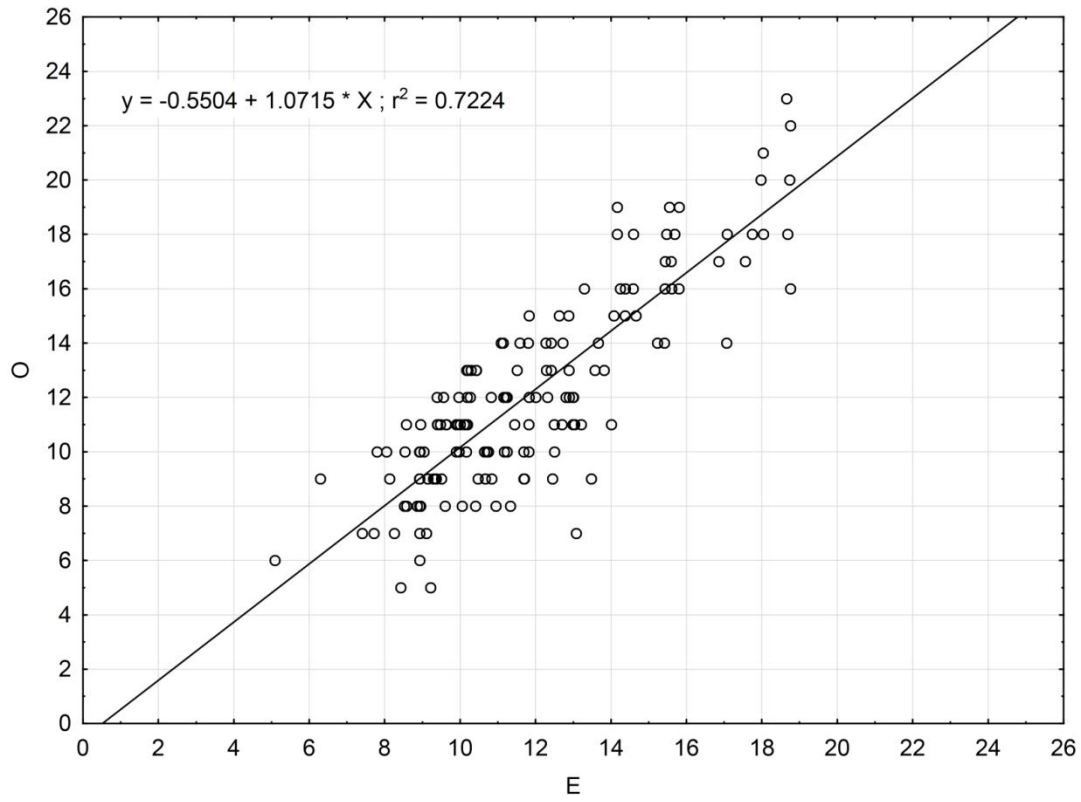


Figure 11 – Box-whisker plots of O/E values for reference calibration, reference validation, test and degraded samples.

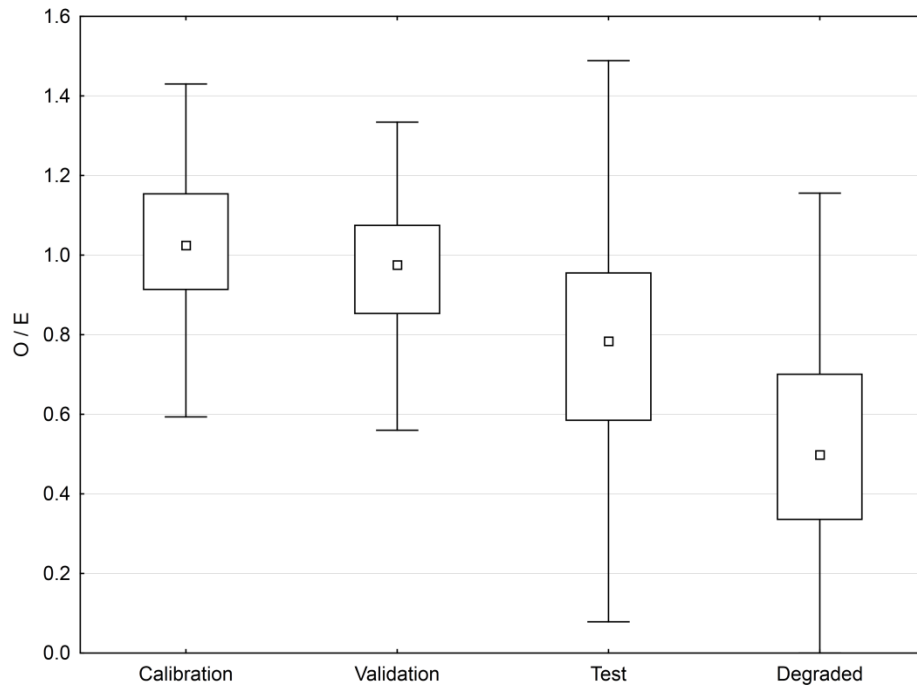


Figure 12 – Box-whisker plots of reference calibration O/E values by biological reference group.

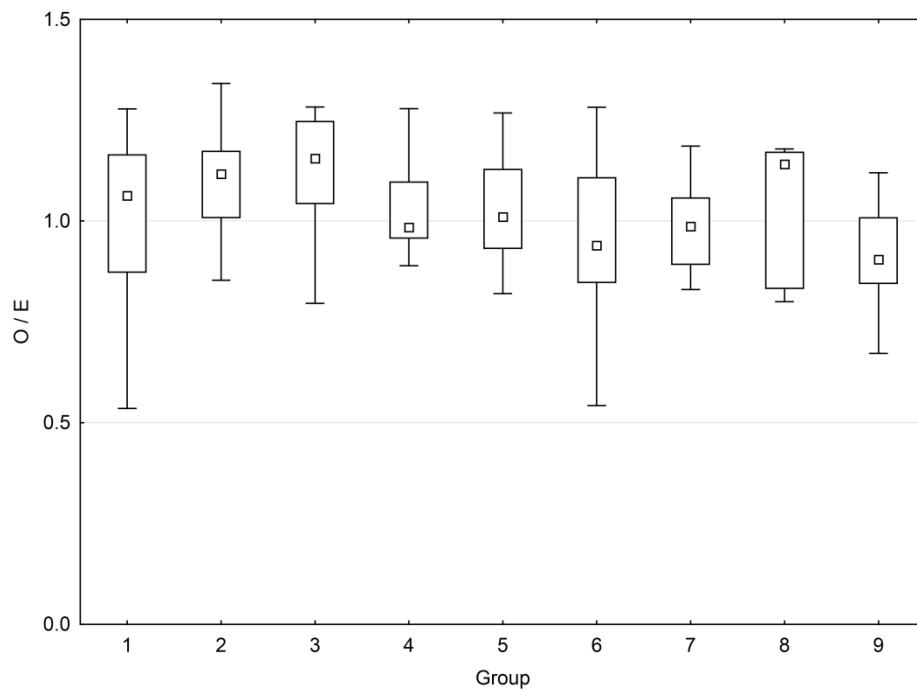


Table 3 – Mean O/E values, P-values and F-values for comparisons between bioregions for both reference calibration and test samples (significant values are italicized). Numbers of samples for each bioregion are noted in parentheses. Capital letters denote homogenous groups as determined from the Tukey multiple comparison tests.

	Volcanic Mountains & Valleys	Southern Foothills & Laramie Range	NE Plains	Southern Rockies	Granitic Mountains	SE Plains	High Valleys	Bighorn Basin Foothills	Sedimentary Mountains	Black Hills	Wyoming Basin	F	P
Reference calibration	1.05 (17) A	1.09 (18) A	0.88 (4) A	1.07 (12) A	0.99 (13) A	1.01 (4) A	1.03 (21) A	0.88 (5) A	1.04 (34) A	0.95 (9) A	1.00 (15) A	1.72 -	0.082 -
Test	0.90 (43) A	0.78 (26) B	0.60 (129) C	0.76 (41) B	0.98 (58) A	0.78 (34) B	0.83 (175) B	0.72 (17) B	0.83 (113) B	0.72 (18) B	0.68 (194) B	15.23 -	<0.001 -

Figure 13 – O/E values for reference calibration and degraded samples among all bioregions. VMV = Volcanic Mountains & Valleys, GM = Granitic Mountains, SM = Sedimentary Mountains, SR = Southern Rockies, SFLR = Southern Foothills & Laramie Range, BBF = Bighorn Basin Foothills, BH = Black Hills, HV = High Valleys, SEP = SE Plains, NEP = NE Plains, and WB = Wyoming Basin.

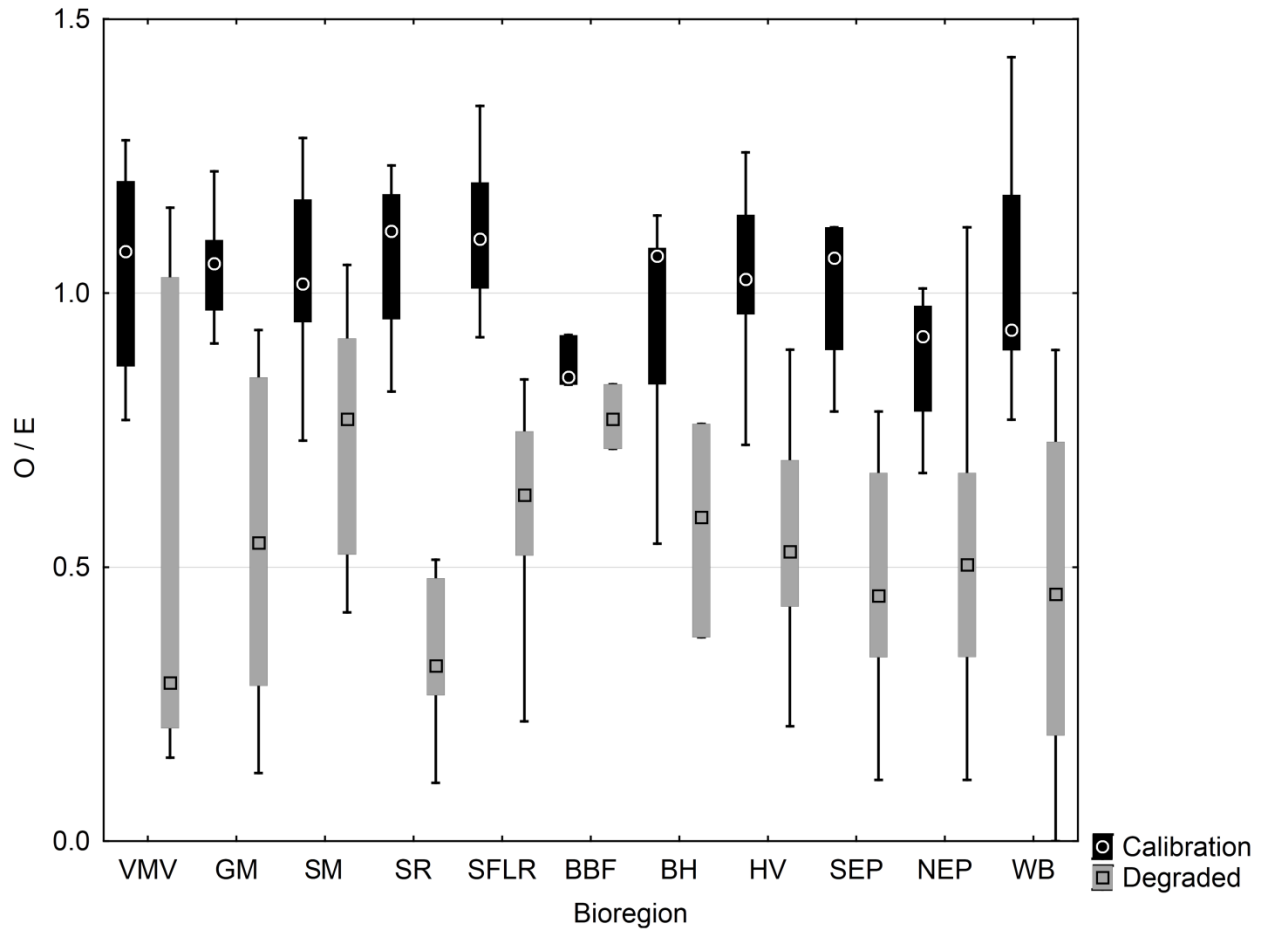


Table 4 – 2012 and 2005 WY RIVPACS O/E value numeric thresholds and associated aquatic life use attainment categories for each bioregion.

Bioregion	Full-support		Indeterminate		Partial/non-support	
	% of Samples (2012 WY RIVPACS)	% of Samples (^a 2005 WY RIVPACS)	% of Samples (2012 WY RIVPACS)	% of Samples (^a 2005 WY RIVPACS)	% of Samples (2012 WY RIVPACS)	% of Samples (^a 2005 WY RIVPACS)
Volcanic Mountains & Valleys	>0.8646 74.1% (n = 80)	>0.8360 80.6% (n = 87)	0.6456 - 0.8646 13.9% (n = 15)	0.6620 - 0.8360 7.4% (n = 8)	<0.6456 12.0% (n = 13)	<0.6620 12.0% (n = 13)
Granitic Mountains	>0.8832 73.0% (n = 73)	>0.8360 60.0% (n = 60)	0.6468 - 0.8832 17.0% (n = 17)	0.6620 - 0.8360 25.0% (n = 25)	<0.6468 10.0% (n = 10)	<0.6620 15.0% (n = 15)
Sedimentary Mountains	>0.8234 63.4% (n = 154)	>0.8360 57.2% (n = 139)	0.6825 - 0.8234 20.2% (n = 49)	0.6620 - 0.8360 25.5% (n = 62)	<0.6825 16.5% (n = 40)	<0.6620 17.3% (n = 42)
Southern Rockies	>0.8917 42.9% (n = 36)	>0.8360 66.7% (n = 56)	0.6208 - 0.8917 38.1% (n = 32)	0.6620 - 0.8360 17.8% (n = 15)	<0.6208 19.0% (n = 16)	<0.6620 15.5% (n = 13)
Southern Foothills & Laramie Range	>0.8818 64.9% (n = 48)	>0.8360 59.5% (n = 44)	0.6838 - 0.8818 20.2% (n = 15)	0.6620 - 0.8360 21.6% (n = 16)	<0.6838 14.9% (n = 11)	<0.6620 18.9% (n = 14)
Bighorn Basin Foothills	>0.8445 40.0% (n = 12)	>0.8360 50.0% (n = 15)	0.6310 - 0.8445 40.0% (n = 12)	0.6620 - 0.8360 26.7% (n = 8)	<0.6310 20.0% (n = 6)	<0.6620 23.3% (n = 7)
Black Hills	>0.8813 50.0% (n = 25)	>0.8360 78.0% (n = 39)	0.5940 - 0.8813 34.0% (n = 17)	0.6620 - 0.8360 4.0% (n = 2)	<0.5940 16.0% (n = 8)	<0.6620 18.0% (n = 9)
High Valleys	>0.8599 49.1% (n = 130)	>0.8360 42.6% (n = 113)	0.6847 - 0.8599 27.5% (n = 73)	0.6620 - 0.8360 28.3% (n = 75)	<0.6847 23.4% (n = 62)	<0.6620 29.1% (n = 77)
SE Plains	>0.7813 46.2% (n = 30)	>0.8360 40.0% (n = 26)	0.5144 - 0.7813 32.3% (n = 21)	0.6620 - 0.8360 15.4% (n = 10)	<0.5144 21.5% (n = 14)	<0.6620 44.6% (n = 29)
NE Plains	>0.7500 31.7% (n = 53)	>0.8360 22.0% (n = 36)	0.5199 - 0.7500 35.4% (n = 59)	0.6620 - 0.8360 25.1% (n = 42)	<0.5199 32.9% (n = 55)	<0.6620 52.3% (n = 89)
Wyoming Basin	>0.8158 31.3% (n = 88)	>0.8360 22.4% (n = 63)	0.6351 - 0.8158 25.3% (n = 71)	0.6620 - 0.8360 19.2% (n = 54)	<0.6351 43.4% (n = 122)	<0.6620 58.4% (n = 164)
Total Samples for all Bioregions	49.4% (n = 724)	46.2% (n = 678)	25.7% (n = 378)	21.6% (n = 317)	24.9% (n = 365)	32.2% (n = 472)

^aHargett et al. (2005 and 2007)

Attainment Category Thresholds

Because the nine reference groups generated for the final RIVPACS model were strongly associated with Wyoming's bioregions, there was reasonable justification to develop bioregion-specific attainment category thresholds. Attainment category thresholds for the WY RIVPACS were based on thresholds developed from the mean, variation and 5th percentile of O/E values calculated from the reference datasets for reach bioregion. Across all bioregions, 'full-support' numeric thresholds ranged from 0.75 to 0.89 whereas 'partial/non-support' thresholds ranged from 0.51 to 0.68 (Table 4). In general, numeric aquatic life use attainment thresholds were higher for mountainous bioregions than for lowland areas in the plains and high desert. This geographic variation in numeric thresholds is representative of the lower quality and number of reference streams in the plains and high desert relative to the mountainous regions.

Aquatic life use attainment assignments to the 1,488 samples differed between the current and previous (Hargett et al. 2007 and 2005) versions of the WY RIVPACS among bioregions (Table 4). At the statewide scale, however, the current WY RIVPACS assigned a similar number of samples to 'full-support' (49.4%) and 'partial/non-support' (24.9%) compared to the 2005 WY RIVPACS (46.2% and 32.2%, respectively). A similar number of samples were assigned an 'indeterminate' rating (25.7%) relative to the previous version (21.6%). WY RIVPACS O/E values and attainment categories for all 1,488 samples evaluated in this study are listed in Appendix C.

Comparisons of WY RIVPACS and WSII

A. Precision

Although the rescaled WSII is only a close approximation to units of O/E, WY RIVPACS was generally more precise (reference calibration O/E standard deviation = 0.136 – 0.196) than the rescaled WSII (standard deviation = 0.116 – 0.284) (Table 5). Marginal relationships ($r^2 < 0.5$) between the WY RIVPACS and rescaled WSII contributed to imprecision between the models in most bioregions (Figure 14). The bioregions with the strongest relationships ($r^2 > 0.5$) between the WY RIVPACS and rescaled WSII were the Granitic Mountains, Southern Foothills & Laramie Range, Southern Rockies, and Volcanic Mountains & Valleys (Figure 14). In the case of the Granitic Mountains and Volcanic Mountains & Valleys bioregions, the rescaled WSII exhibited better precision than the WY RIVPACS (Table 5). Pearson correlations (r) between WY RIVPACS and rescaled WSII values were 0.60-0.78 (all bioregions = 0.69) among bioregions (Figure 14) and similar to correlations of other MMI and O/E models developed in the United States (Herbst and Silldorff 2006, Hawkins et al. 2010).

A. Bias

In most bioregions, the rescaled WSII was the biased (y -intercepts > 0 , slopes < 1 , $P < 0.05$) predictor of biological condition relative to WY RIVPACS predictions (Table 6, Figure 14). Values of wr^2 were low and less than r^2 for almost all bioregions indicating that over or under-prediction is an important factor in the relationships between O/E and rescaled WSII (Table 6). Values of d_{rel} indicated that model bias was apparent throughout the range of O/E and rescaled WSII values among all bioregions (range: 0.585 to 0.743) (Table 6). However, NSE values implied that model bias at the extreme ranges of O/E values and rescaled WSII scores was particularly important in the Bighorn Basin Foothills, Black Hills, High Valleys and SE Plains bioregions (range: -0.09 to -2.44) (Table 6).

Similar to findings on comparisons of other MMI and RIVPACS-type models by Hawkins (2006), these results indicate the rescaled WSII generally predicts a higher biological condition than that implied by the WY RIVPACS. In the cases of the Bighorn Basin Foothills, SE Plains and Southern Rockies bioregions, the WY RIVPACS predicts a higher biological condition than the rescaled WSII. The rescaled WSII's over or under-prediction relative to the WY RIVPACS is most apparent for more degraded samples within the Bighorn Basin Foothills, Black Hills, High Valleys and SE Plains, though this difference becomes less apparent as samples approach reference condition. Pair-wise differences in O/E and rescaled WSII

values were not significant ($P > 0.05$) when model bias was evaluated across all samples for each bioregion (Table 6).

Table 5 - Mean and standard deviations of O/E and rescaled 2011 WSII scores for reference calibration samples among all bioregions.

	O/E	2011 WSII Rescaled
Bighorn Basin Foothills	0.88 ± 0.136	1.00 ± 0.189
Black Hills	0.95 ± 0.196	0.99 ± 0.284
Granitic Mountains	0.99 ± 0.193	0.99 ± 0.116
High Valleys	1.03 ± 0.142	1.00 ± 0.266
NE Plains	0.88 ± 0.146	1.00 ± 0.261
SE Plains	1.01 ± 0.158	1.00 ± 0.168
Sedimentary Mountains	1.04 ± 0.154	1.00 ± 0.257
Southern Foothills & Laramie Range	1.09 ± 0.158	1.00 ± 0.188
Southern Rockies	1.07 ± 0.144	0.99 ± 0.272
Volcanic Mountains & Valleys	1.05 ± 0.182	0.99 ± 0.167
Wyoming Basin	1.00 ± 0.192	1.00 ± 0.280

Table 6 - Mean O/E and rescaled 2011 WSII scores with corresponding Paired t-test and p-values, regression statistics, NSE and d_{rel} for test samples among all bioregions. Italicized values are significant at $P < 0.05$.

	O/E	2011 WSII Rescaled	Difference	t	P	a	b	r ²	w r ²	NSE	d_{rel}
Bighorn Basin Foothills	0.74	0.66	0.09	1.24	0.226	-0.58	1.67	0.50	0.30	-2.44	0.605
Black Hills	0.79	0.87	0.08	1.77	0.084	0.11	0.95	0.36	0.34	-0.74	0.652
Granitic Mountains	0.96	0.92	0.03	1.92	0.059	0.21	0.74	0.56	0.41	0.48	0.727
High Valleys	0.79	0.77	0.03	1.75	0.082	0.09	0.59	0.42	0.25	-0.09	0.710
NE Plains	0.59	0.60	0.01	0.52	0.601	0.11	0.82	0.41	0.34	0.01	0.645
SE Plains	0.70	0.63	0.07	1.59	0.118	-0.07	1.00	0.38	0.38	-0.70	0.691
Sedimentary Mountains	0.86	0.86	0.00	0.10	0.922	0.17	0.73	0.39	0.29	0.34	0.585
Southern Foothills & Laramie Range	0.88	0.91	0.03	1.25	0.218	0.34	0.65	0.61	0.40	0.57	0.743
Southern Rockies	0.78	0.83	0.05	1.69	0.095	-0.03	1.10	0.57	0.52	0.04	0.727
Volcanic Mountains & Valleys	0.93	0.90	0.03	1.30	0.198	0.28	0.67	0.52	0.35	0.21	0.609
Wyoming Basin	0.61	0.57	0.04	1.89	0.060	0.17	0.65	0.34	0.22	0.03	0.659

B. Sensitivity

Despite evidence of model bias among all bioregions of Wyoming with regard to model values, aquatic life use attainment category assignments did not differ significantly between the WY RIVPACS and the WSII. The number of cases where one model implied 'full-support' in contrast to a 'partial/non-support' assignment by the other model for the same sample (i.e. discrepancies) was similar between the WY RIVPACS and WSII (binomial tests, $P = 0.099 - 1.000$) among test samples in all bioregions and statewide (Table 7). Likewise, the number of cases where one model implied 'full-support' or 'partial/non-support' in contrast to an 'indeterminate' rating by the other model for the same sample was generally similar between the WY RIVPACS and WSII among most bioregions and statewide (binomial tests, $P = 0.096 - 1.000$) (Table 7). The exceptions were the NE Plains, Sedimentary Mountains and Southern Rockies bioregions, where one model assigned a significantly greater number of test samples ($P < 0.05$) to 'indeterminate' than the other model (Table 7). The percentage of discrepancies for test samples among bioregions ranged from 0% to 16% with a mean of 6% for all bioregions combined (Table 7).

Table 7 - Concurrence between WY RIVPACS and WSII aquatic life use assessments among test samples in all bioregions. Values represent percentages within concurrence categories. Numbers of samples are in parentheses. Italicized values are significant at P<0.05.

Concurrence Category	Volcanic Mountains & Valleys	Southern Foothills & Laramie Range	NE Plains	Southern Rockies	Granitic Mountains	SE Plains	High Valleys	Bighorn Basin Foothills	Sedimentary Mountains	Black Hills	Wyoming Basin	All Bioregions
A) Both WY RIVPACS and WSII agree on partial/non-support condition	19 (8)	8 (2)	24 (27)	18 (7)	2 (1)	7 (2)	14 (25)	31 (5)	18 (20)	17 (3)	27 (48)	18 (148)
B) Discrepancy in full-support or partial/non-support condition - Only WY RIVPACS implies partial/non-support condition	0 (0)	0 (0)	1 (1)	3 (1)	3 (2)	4 (1)	1 (2)	0 (0)	4 (5)	6 (1)	6 (11)	3 (24)
C) Discrepancy in full-support or partial/non-support condition - Only WSII implies partial/non-support condition	5 (2)	0 (0)	4 (4)	0 (0)	0 (0)	11 (3)	2 (3)	0 (0)	9 (9)	0 (0)	10 (17)	5 (38)
D) Both WY RIVPACS and WSII agree on full-support condition	37 (16)	35 (9)	25 (29)	22 (9)	64 (37)	48 (13)	31 (54)	31 (5)	21 (24)	22 (4)	15 (27)	28 (227)
E) Combination of indeterminate-partial/non-support or indeterminate-full support - Only WY RIVPACS implies indeterminate status	7 (3)	12 (3)	24 (27)	35 (14)	14 (8)	15 (4)	20 (35)	25 (4)	12 (13)	38 (7)	18 (32)	18 (150)
F) Combination of indeterminate-partial/non-support or indeterminate-full support - Only WSII implies indeterminate status	23 (10)	35 (9)	11 (13)	7 (3)	9 (5)	0 (0)	19 (34)	0 (0)	27 (31)	11 (2)	18 (32)	17 (139)
G) Both WY RIVPACS and WSII agree on indeterminate status	9 (4)	12 (3)	11 (13)	15 (6)	9 (5)	15 (4)	13 (22)	13 (2)	10 (11)	6 (1)	6 (11)	10 (82)
Binomial test P values												
Comparison of B to C (discrepancies)	0.477	1.000	0.371	1.000	0.480	0.617	1.000	1.000	0.182	1.000	0.345	0.099
Comparison of E to F	0.096	0.149	<i>0.040</i>	<i>0.015</i>	0.579	0.221	1.000	0.134	<i>0.010</i>	0.182	1.000	0.556

Figure 14 – Regressions between O/E values and rescaled WSII scores for test samples among bioregions. Dashed black lines represent the ideal 1:1 relationship between the models whereas solid black lines represent the linear best-fit relationships. Gray solid lines represent the numeric 'full-support' thresholds in values of O/E for each model. Similarly, dotted gray lines represent the numeric 'partial/non-support' thresholds.

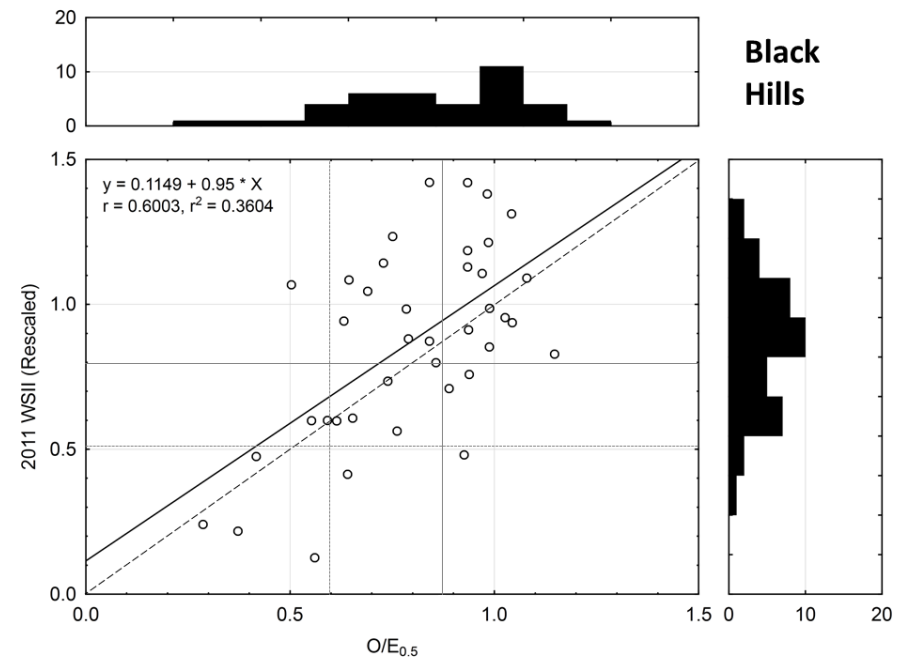
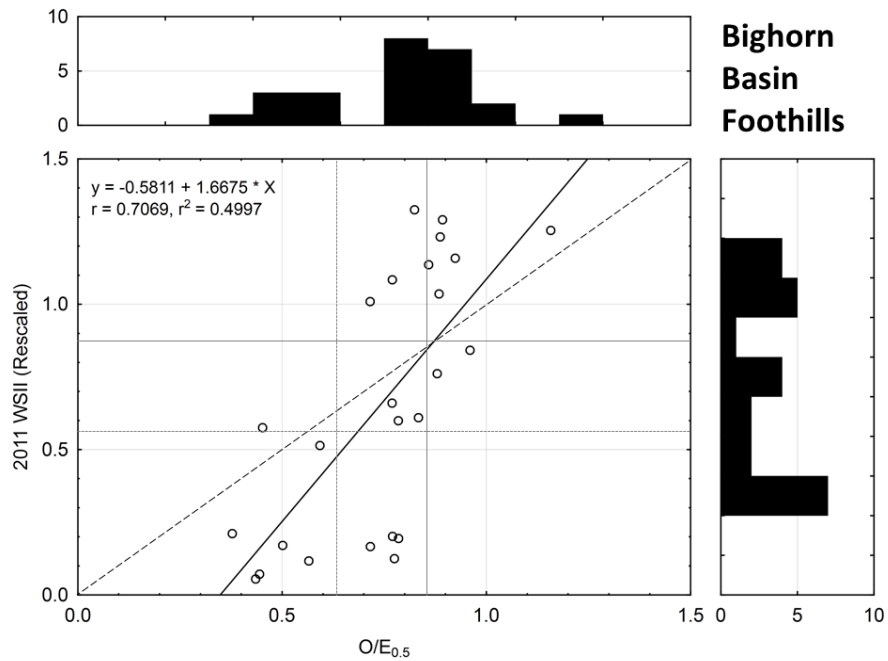


Figure 14 (cont.) – Regressions between O/E values and rescaled WSII scores for test samples among bioregions. Dashed black lines represent the ideal 1:1 relationship between the models whereas solid black lines represent the linear best-fit relationships. Gray solid lines represent the numeric 'full-support' thresholds in values of O/E for each model. Similarly, dotted gray lines represent the numeric 'partial/non-support' thresholds.

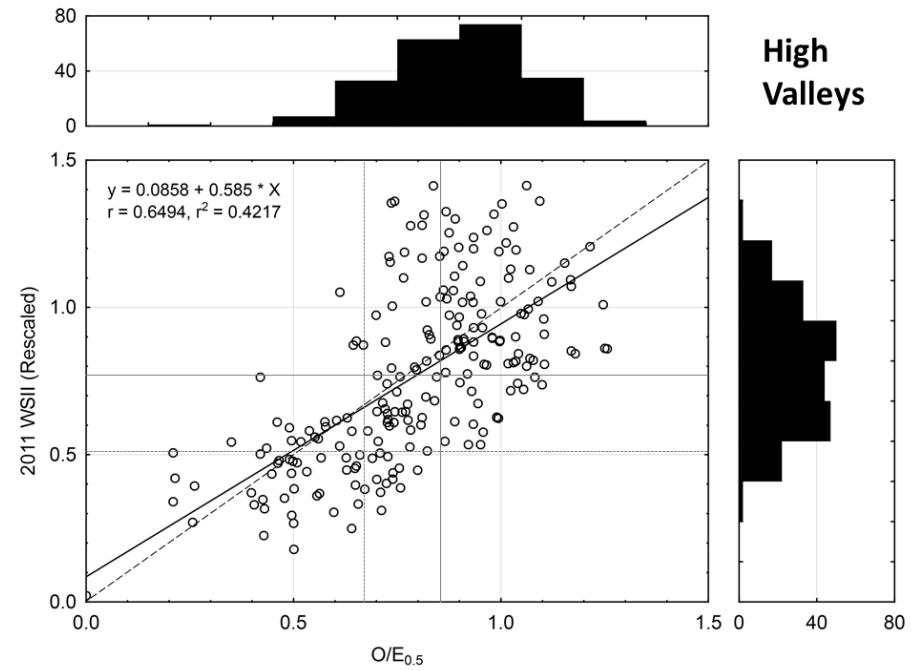
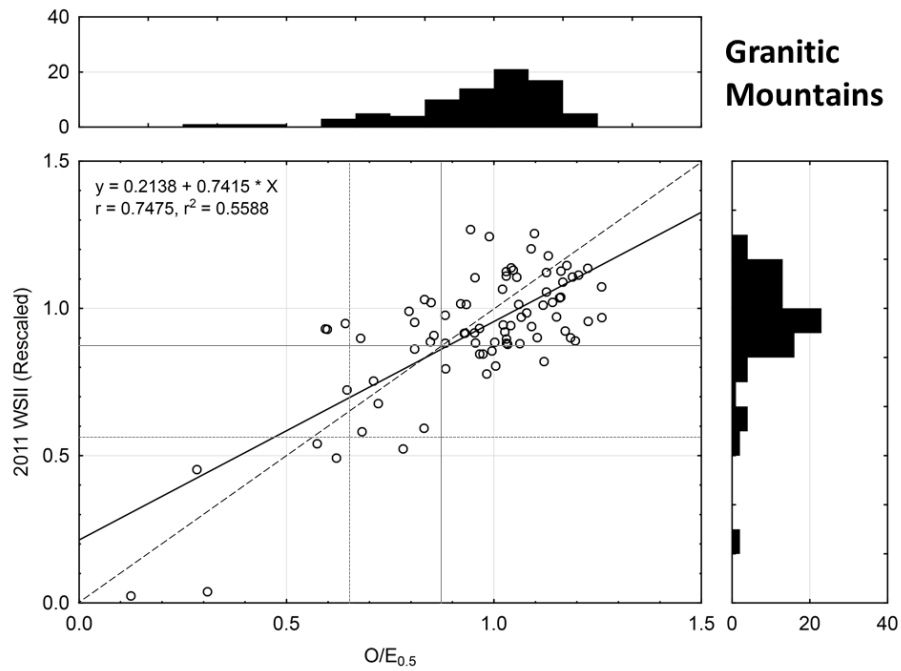


Figure 14 (cont.) – Regressions between O/E values and rescaled WSII scores for test samples among bioregions. Dashed black lines represent the ideal 1:1 relationship between the models whereas solid black lines represent the linear best-fit relationships. Gray solid lines represent the numeric 'full-support' thresholds in values of O/E for each model. Similarly, dotted gray lines represent the numeric 'partial/non-support' thresholds.

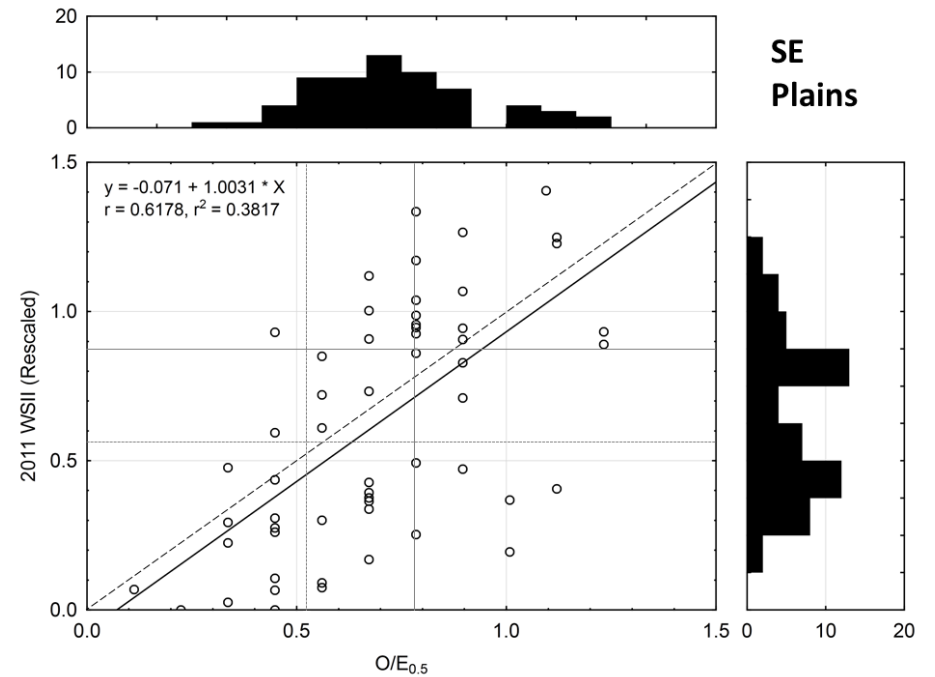
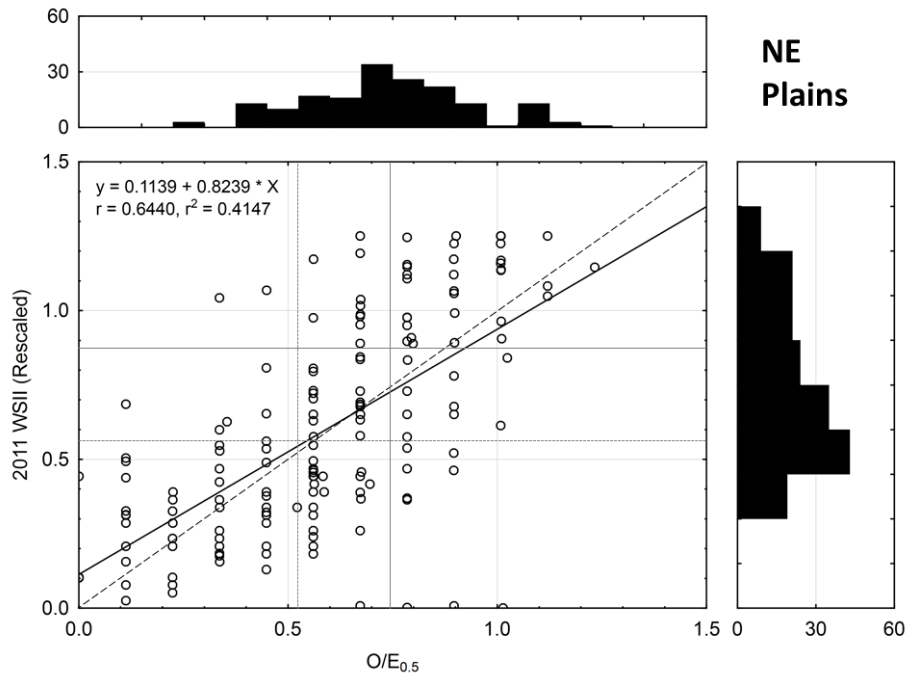


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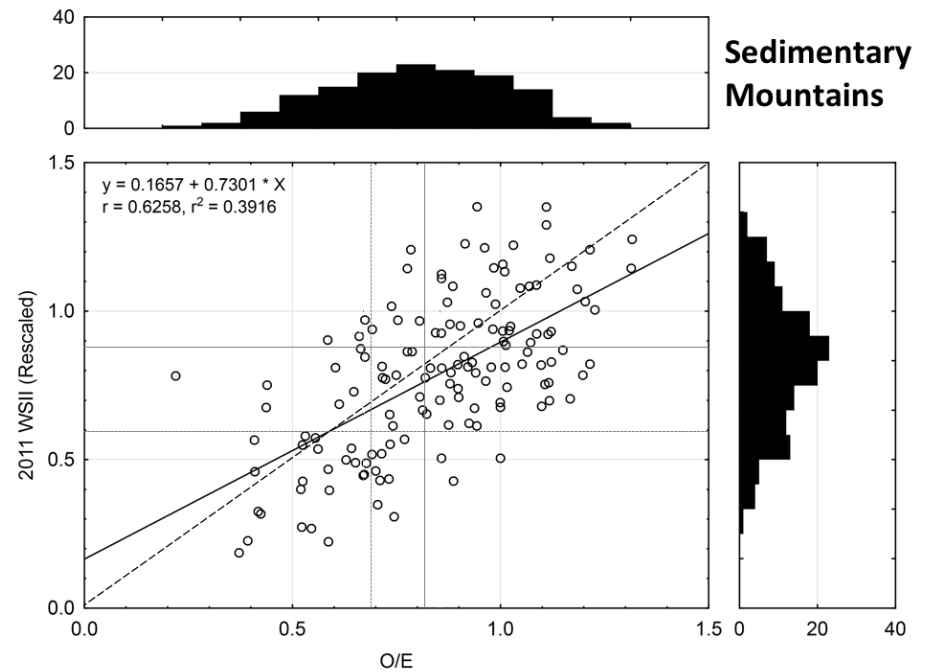
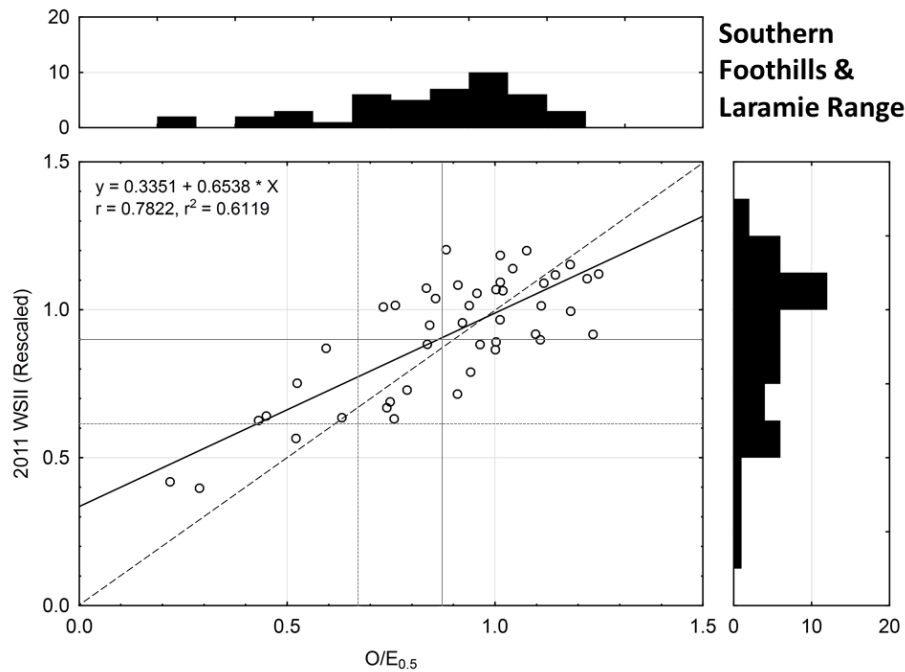


Figure 14 (cont.) – Regressions between O/E values and rescaled WSII scores for test samples among bioregions. Dashed black lines represent the ideal 1:1 relationship between the models whereas solid black lines represent the linear best-fit relationships. Gray solid lines represent the numeric 'full-support' thresholds in values of O/E for each model. Similarly, dotted gray lines represent the numeric 'partial/non-support' thresholds.

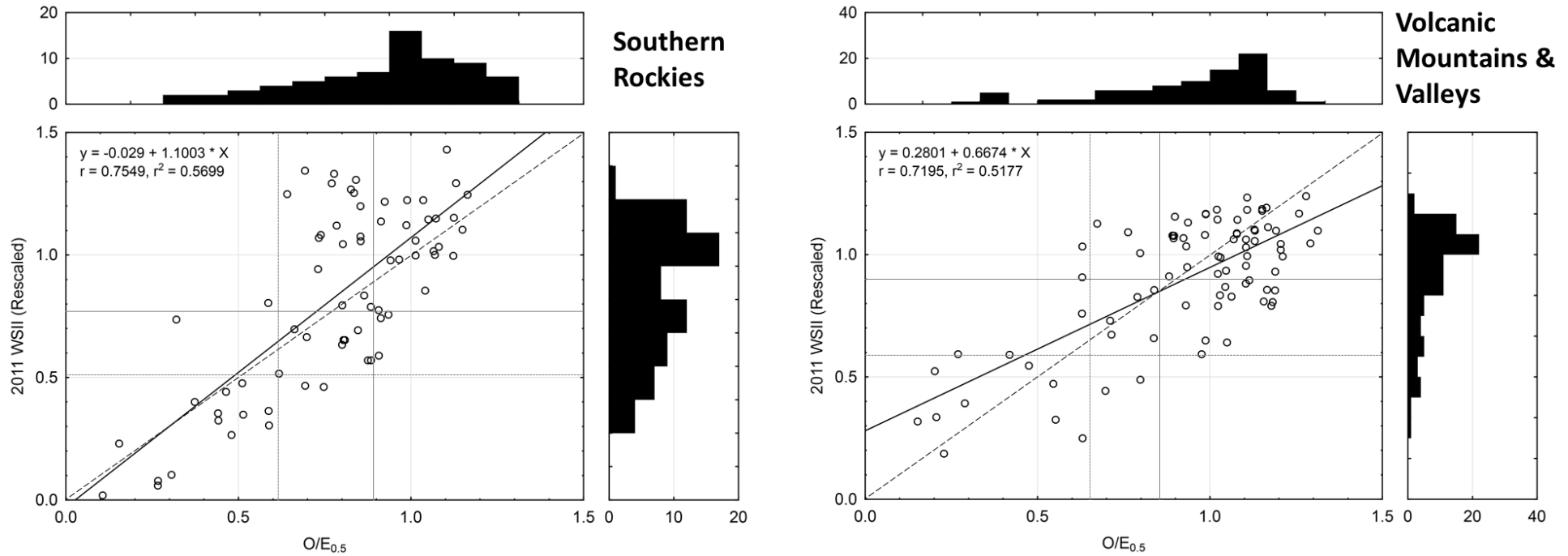
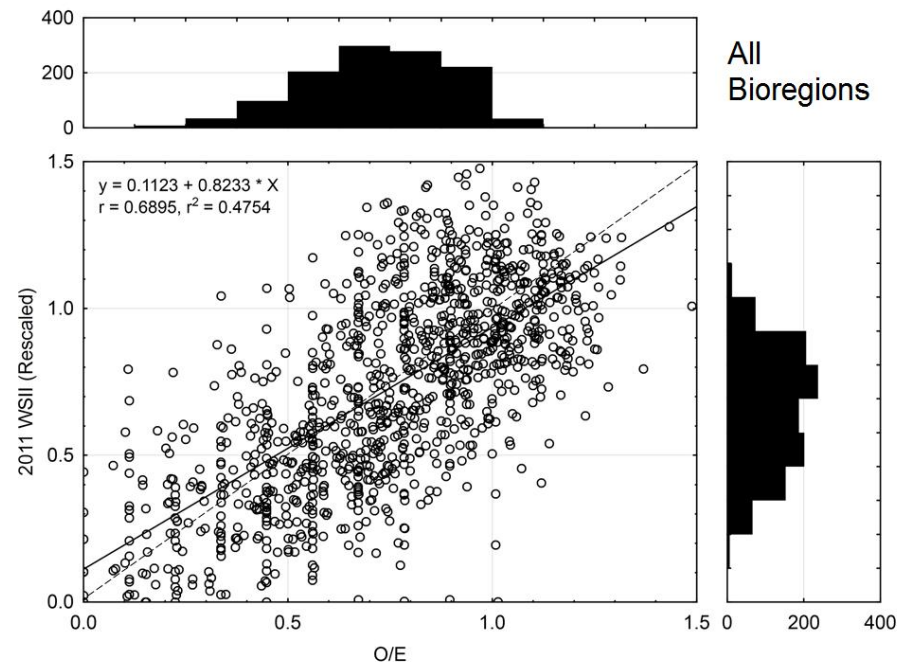
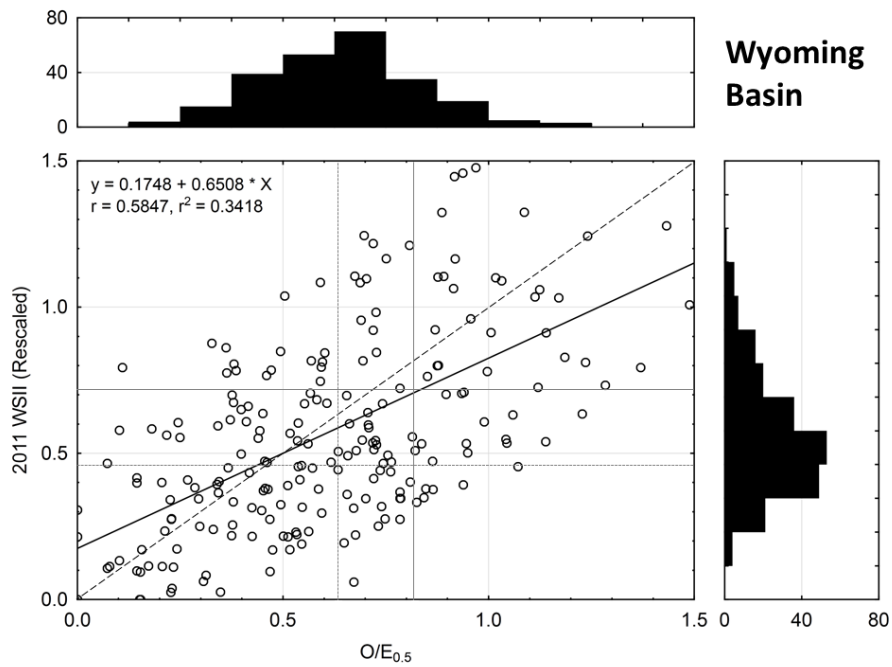


Figure 14 (cont.) – Regressions between O/E values and rescaled WSII scores for test samples among bioregions. Dashed black lines represent the ideal 1:1 relationship between the models whereas solid black lines represent the linear best-fit relationships. Gray solid lines represent the numeric 'full-support' thresholds in values of O/E for each model. Similarly, dotted gray lines represent the numeric 'partial/non-support' thresholds.



DISCUSSION

Classification and Predictor Variables

Water quality, flow regimes and geomorphic attributes of Wyoming's wadeable streams and rivers are naturally diverse as a result of the environmental heterogeneity of the region. The biological and particularly benthic macroinvertebrate assemblages are no exception as their structure, composition and tolerances to stressors are strongly adapted to and dictated by the natural abiotic factors of the streams and associated watersheds where they occur. Disturbances to surface waters from human activities such as urbanization, agriculture, hydrologic modifications, mineral extraction and timber-harvesting can range from subtle to significant with concomitant impacts to the habitat and biota of streams in Wyoming. Successful evaluation of Wyoming stream and river biological condition requires a predictive model with ecologically relevant predictor variables that is responsive to the range of human disturbance, yet accounts for natural variability in the structure of benthic macroinvertebrate assemblages.

The number and diversity of reference sites are crucial in development of a predictive model to adequately capture the natural environmental heterogeneity of abiotic and biotic factors in Wyoming streams and rivers. Since development of the original WY RIVPACS, the number of samples within the Wyoming reference dataset increased by almost 50% from 296 to 475 samples – several of which were new reference sites. These additional reference samples not only improved reference representation for streams and rivers in the foothills, plains and high desert regions but also helped to better capture reference expectations within the transitional ecotones of Wyoming. The enhanced reference dataset precluded the inclusion of lower quality (higher variability) reference samples while still maintaining the best possible resolution and representation of expected benthic macroinvertebrate assemblages.

The high diversity in benthic macroinvertebrate assemblages in Wyoming was represented by nine reference groups – a reduction of six from the original WY RIVPACS. Because reference groups are used to calculate frequencies of occurrence for different taxa within each group, fewer reference groups ultimately resulted in a less statistically complex predictive model without a loss in accuracy and precision. A less statistically complex model also reduces the chances of the model being overfit. The nine reference groups corresponded strongly to the bioregions developed for the new WSII (Hargett 2011). These strong similarities were anticipated since there was a concerted effort to use the same or similar biological reference groups in the development of both the WSII and WY RIVPACS to improve commonality in the statistical and to some degree biological properties of each model.

Presumably a benefit of an enhanced reference calibration dataset and fewer reference groups, only eight predictor variables (compared to 14 used in the original WY RIVPACS) were required to capture the environmental heterogeneity in benthic macroinvertebrate assemblages in Wyoming. The current WY RIVPACS uses several of the same predictor variables of RIVPACS models developed in Great Britain, Australia, other regions of the United States and the original WY RIVPACS (Clarke et al. 2003, Hargett et al. 2007, 2005; Hawkins 2006; Hawkins et al. 2000; Moss et al. 1987; Simpson and Norris 2000). The strongest predictor variables in this WY RIVPACS were those that described longitudinal location, the area of the drainage basin upstream from a sample location and whether a sample was located within the combined Southern Rockies & Bighorn Mountain region. Elevation, temperature and precipitation as individual variables were all weak predictors within all models evaluated. However, the model's use of longitude and to some degree latitude implies that the combined effects of temperature, elevation, precipitation and even geology have a large role in structuring the aquatic assemblages which is consistent with ideas and observations of Hawkins et al. (1997, 2000), Vannote and Sweeney (1980) and Vannote et al (1980) among others. Watershed area may function as a surrogate that describes the longitudinal 'zonation' of stream biota along stream networks in response to physical and chemical factors with distance downstream (Hynes 1970). The significance of the four bioregion predictors suggest that differences in stream macroinvertebrate assemblages across Wyoming are tied to some extent to broad-scale abiotic and biotic factors acting upon streams such as stream geomorphology, vegetation, climate, soils, hydrology and biogeography. As with the original WY RIVPACS, the continued use of alkalinity

demonstrates that geologic setting has a strong effect on invertebrate distributions by affecting both physical and chemical aspects of the stream environment.

Clearly, the WY RIVPACS strengthens the concept that RIVPACS models can be developed almost entirely on map-level predictor variables. Out of the eight predictor variables used in WY RIVPACS, only alkalinity is field-derived. This type of model increases the practicality and simplicity of its use in that almost all of the predictor variables can be easily and quickly measured using GIS. This version of WY RIVPACS adds to the growing body of literature that GIS variables can be used as suitable surrogates for field collected variables that are important in influencing macroinvertebrate assemblages, but may be influenced by anthropogenic activities.

Model Performance and Validation

WY RIVPACS continues to possess the accuracy and precision to detect even modest degradation. In fact, model precision (SD of reference calibration O/E values) improved from 0.174 to 0.169. Precision of WY RIVPACS was comparable to other successful RIVPACS models (SD \leq 0.18) developed in the United States (Hawkins 2006 and Hawkins et al. 2000). Contrary to the previous version, there was no evidence of significant systematic bias among bioregions or among the nine reference groups. The removal of systematic bias from this version of WY RIVPACS can be attributed to the enhanced reference dataset through 1) better representation of the macroinvertebrate assemblages among all bioregions, 2) fewer reference groups along with improved classification of sites within a bioregion into as few reference groups as possible, and 3) removal of lower quality reference samples and consequently a reduction in natural variability, from the reference calibration dataset.

The mean and standard deviation of O/E values for samples in the reference calibration and validation datasets were similar and implies that the WY RIVPACS should accurately predict expected biological condition for new datasets. Furthermore, the WY RIVPACS accounts for approximately 80% of the natural variability in the reference calibration dataset. These results combined with output from the cross-validation and re-substitution techniques in addition to estimates of model error for all possible models, indicates a low probability that the model is overfit. In other words, the model does not spuriously associated random variation in biological structure with variation in predictor variables, which could result in either imprecise or biased predictions.

Temporal Variability in Reference Condition

Temporal variability in macroinvertebrate assemblage structure is associated not only with life-history traits such as timing of emergence and dispersal, but also temporal variation in both environmental variables and measurement error. Temporal variation in either biotic processes or environmental setting could influence the prediction of E and the estimate of O/E values. Similar to findings from the original WY RIVPACS, temporal variability in biological condition, as measured by O/E, was relatively constant through time as indicated by the low mean CV of 12%. Thus, it can be inferred that the WY RIVPACS was reasonably temporally robust in spite of inter-annual changes in macroinvertebrate assemblages, environmental factors and crew sampling efficiencies.

Detection of Anthropogenic Disturbance

Because the model was able to predict invertebrate richness across a broad range of naturally differing stream conditions with negligible systematic bias, any deviation between observed and predicted assemblages beyond model error can be interpreted as biological degradation associated with one or more environmental stressors. A large proportion of the test samples were not monitored as part of a statistically stratified probabilistic study design across Wyoming. Rather, they represent a collection of samples monitored as part of stream-specific targeted assessments over the seventeen-year time frame of the dataset. Thus, WY RIVPACS output for these test samples does not represent an accurate and unbiased sample of biological condition for wadeable streams and rivers in Wyoming or for individual

bioregions for the 1993 to 2009 period. Nevertheless, general spatial patterns in mean test sample O/E values among bioregions can be derived from the dataset. The WY RIVPACS revealed that most test samples have received some degree of anthropogenic disturbance. As with the original WY RIVPACS, test samples with high O/E values were primarily distributed among Wyoming's mountainous regions, particularly the northwest portion of the state where potential for human disturbance is relatively minimal. Areas with the highest density of test samples with appreciably low O/E values were confined to the plains of northeast Wyoming. Interestingly, O/E values of known degraded samples were similar among bioregions suggesting that no one bioregion exhibited more severely degraded streams than another. Similar distributions of low O/E values among the bioregions were observed within the context of the aquatic life use attainment categories. Bioregions with some of the highest percentages of samples within the 'partial/non-support' category ($\geq 50\%$ loss of expected taxa) were the lower elevation Wyoming Basin, NE Plains, SE Plains and the transitional High Valleys. This comes as no surprise given that the majority of human development (and their influences on aquatic systems) and the major population centers of Wyoming occur in these bioregions. Predominant human activities that have the potential to either directly or indirectly alter the biota of stream ecosystems in these lower elevation areas include hydrologic modifications, point and non-point source pollutants, channelization, historic legacy impacts, excessive channel sedimentation or degradation and riparian disturbance.

WY RIVPACS Limitations

All biological statistical models are imperfect abstract representations that express specific aspects of complex ecosystems, with limitations in their application. WY RIVPACS is no different and has limitations in its application that must be considered by potential users. WY RIVPACS is designed to flag samples that fall outside the experience of the model and thus prevent extrapolation of predictions to environmental settings beyond those used in model development. In general, incomplete representation by the reference network of the range of naturally occurring conditions in the region of interest could lead to unreliable estimates of E in some samples. Overall, the number of samples flagged by the WY RIVPACS as outside model experience was appreciably less than with the original model. Specifically, the original WY RIVPACS flagged 17% of repeat reference, test and degraded samples as outside model experience, primarily due to inadequate reference representation in portions of the plains and high desert regions of Wyoming (Hargett et al. 2005, 2007). Only 4% of the combined repeat reference, test and degraded samples fell outside the experience of the current WY RIVPACS, the improvement presumed to be the result of improved reference representation throughout Wyoming, better defined reference groups within the model and the selection of predictor variables (primarily geographically-based) where expected ranges are adequately represented in the dataset. In general, the unsuccessful model predictions for this 4% of samples appeared to be largely the result of samples with alkalinities and watershed areas that fell outside the range of conditions within the reference calibration dataset. Most of these were test or degraded samples that were located on large reservoir-controlled reaches of the Bighorn, North Platte and Shoshone Rivers – all high Strahler order systems with large contributing watersheds. Identification of reference conditions for these rivers has proven difficult because of the widespread human disturbances that impact the chemical, physical and biological attributes of these systems. This same limitation presumably applies to other reservoir-regulated large river segments in Wyoming like the Green River below Fontenelle Reservoir and the Snake River below Jackson Lake. This limitation in the model can only be remedied by inclusion of appropriate 'best attainable' reference sites for these reservoir-controlled large river segments.

Representation of reference conditions for high desert streams with snow-melt dominated flow regimes and those with mixed origins located in central Wyoming has improved considerably with this current version of WY RIVPACS. However, insufficient reference representation remains an issue for streams located within three subregions of the high desert of Wyoming (i.e. Wyoming Basin bioregion): the Bighorn Basin of north-central Wyoming (excluding the foothills), non-montane spring-fed stream segments within the interior of the Wyoming Basin and mixed origin streams of extreme southwest Wyoming. Reference streams are few or absent for these subregions; consequently expected biological conditions for these areas may not be well represented in the model, which may lead to under or over-

predictions of biological condition by the WY RIVPACS. The difficulty in identifying reference quality stream segments in these subregions is related to the extensive human alterations of these areas. The aquatic biota of streams in these subregions of the Wyoming Basin are subjected to multiple, and in some locations, pervasive stressors that include extensive flow alterations, irrigated agriculture, point-source discharges and riparian disturbance. Geomorphic stability of many stream channels and rates at which biological recovery proceeds remains in a state of flux as they continue to adjust from historical legacy impacts further complicated by current land use activities. This limitation is partially addressed through development of conservative aquatic life use attainment numeric thresholds that implicitly account for the insufficient representation of reference conditions within these subregions and the overall lower quality of reference conditions throughout the greater Wyoming Basin bioregion. Ultimately, identification of least-impacted reference or perhaps even best attainable expectations is needed to adequately represent the expected aquatic life condition in these three subregions of Wyoming's high desert.

As discussed with the previous WY RIVPACS, achievable biological condition for effluent-dependent streams may be less than would be expected for naturally perennial streams in the region due to concomitant alterations of the channel and flows in addition to water quality conditions from discharged effluent. Because of their unique characteristics, the sensitivity and general applicability of the WY RIVPACS to effluent-dependent systems is contingent on the appropriateness of the model's predicted biological condition. WY RIVPACS is unable to discern the native flow regime of an effluent-dependent system and therefore makes a prediction based on the assumption that the stream is naturally perennial. For such streams, case-by-case decisions must be made on whether the network of reference sites used to build the model provides adequate expectations of biological condition.

Though the existing reference site network has grown considerably since the original WY RIVPACS, there continues to be inadequate representation for stream segments with very small watersheds $< 12 \text{ km}^2$ ($< 5 \text{ mi}^2$) and those located at high montane elevations $> 2,740 \text{ m}$ ($> 9,000 \text{ ft}$). These stream segments may prove difficult to accurately assess with the WY RIVPACS.

Because the WY RIVPACS was developed with quantitative data collected from targeted riffle/run habitats, it cannot be used to assign aquatic life use attainment category ratings to multi-habitat samples collected with dip nets or other semi-qualitative methods. Application of the WY RIVPACS to data collected with semi-quantitative methods could lead to over or under-prediction of biological condition. Lastly, this model should not be used to assign aquatic life use attainment category ratings on ephemeral or intermittent streams segments or extremely low-gradient lentic-type systems since the WY RIVPACS was specifically developed to evaluate the biological condition for perennial lotic systems.

Comparability between WY RIVPACS and WSII

The degree of comparability between two biological indicators is generally contingent on measurement of the same biological properties and that both indicators perform similarly in response to stress (Hawkins 2006). The WSII is a compilation of several bioregion-specific multimetric indices (MMI) that measure a variety of metrics associated with the structure, composition, functional feeding group, habitat and tolerances of the benthic macroinvertebrate community (Hargett 2011). WY RIVPACS measures only the presence/absence of specific taxa within the community. The WY RIVPACS and WSII respond to environmental stressors similarly as noted by the moderate to high correlations in model outputs among most bioregions, regardless that each model measures different attributes of the lotic benthic macroinvertebrate community.

Comparability of both models was optimized through use of the same dataset, reference sites, taxonomic resolution, reference group clustering and other methodological factors as recommended by Cao and Hawkins (2011). Despite equivalency in these factors, the WSII and WY RIVPACS displayed precision differences and bias. The WY RIVPACS generally provided more precise estimates of biological condition among bioregions than the WSII. Sample-specific assessments of biological condition within the context

of model values also differed between the two models, with the WSII generally predicting a higher biological condition than the WY RIVPACS. In the Bighorn Basin Foothills, Black Hills, High Valleys and SE Plains bioregions, these biases are most apparent for degraded samples that become less of an issue as values approach reference condition. At the bioregion or state scale, the bias between the WSII and WY RIVPACS becomes less apparent. The performance patterns between the WY RIVPACS and WSII are generally consistent with comparisons made between other MMI and O/E models (Hawkins 2006, Hawkins et al. 2010, Herbst and Silldorff 2006, Ode et al. 2008). The available information implies that differences in the basic biological and statistical properties are primary contributors to the systematic differences in model bias and precision variability between the WY RIVPACS and WSII.

When model values are codified into aquatic life use attainment categories, model bias becomes less of an issue. Assessments of biological condition within the context of the aquatic life use attainment categories were comparable between the WY RIVPACS and WSII both at the sample and bioregion scale. The mean percentage of samples with discrepancies (one model implies 'full-support' whereas the other model implies 'partial/non-support') in aquatic life use attainment categories among all bioregions was only 6% - an improvement from the 15% of samples with discrepancies between the former WSII (Hargett and ZumBerge 2006) and original WY RIVPACS (Hargett et al. 2005 and 2007). This percentage of inconsistencies is less than the ~25% disagreement found with other indicators (Hawkins 2006), though this percentage reflects inconsistencies in raw model output that had not been codified by condition categories. The low percentage of inconsistency in aquatic life use attainment assignments between the WY RIVPACS and WSII is the result of 1) setting reasonable numeric thresholds for each attainment category that address much of the systematic differences between both models and 2) integration of an 'indeterminate' attainment category that explicitly recognizes uncertainty (model error) while maintaining the ability of each model to provide meaningful assessments of biological condition within the context of whether a waterbody is supportive of its designated aquatic life uses.

WY RIVPACS explicitly models the predicted taxa whereas reference sites grouped by bioregion are used to derive expectations for the WSII. Furthermore, both models assume linear relationships between biological condition and environmental stressors which may not accurately represent non-linear gradients that may exist for particular stressors (i.e. nutrients). This information combined with the fact that each model measures different biological attributes, it is unreasonable to expect that both models will always produce similar assessments of biological condition (e.g. discrepancies will occur) which is consistent with the views of Cao and Hawkins (2011). In other words, the biological attributes that each model measures are not ecologically equivalent.

These dissimilarities in ecological measurements and their influence on output of both models may be best described within a modification of Micheli et al. (1999) stressor-response framework as it relates to O/E versus MMI assessments. Conceptually, there are four types of community responses to environmental stressors that could be reflected in output from the WY RIVPACS and WSII: a) no effect, b) change in aggregate variability only (i.e. all expected taxa are present though there may be shifts in relative abundances for particular taxa and taxa groups), c) change in compositional variability only (i.e. relative abundances of particular taxa and taxa groups are within expected conditions, though there may be a loss in expected taxa) or d) changes in both aggregate and compositional variability occur. In stream systems experiencing category b or c stressor-responses, either scenario may result in biological condition discrepancies between the WY RIVPACS and WSII. Thus, cases of discrepancy are informative when evaluating biological condition and may in fact reflect real ecological conditions that were occurring at the time the sample was collected. These ecological conditions may include, but are not limited to, factors such as taxa replacement in response to stress, naturally low diversity and highly variable environmental conditions common to headwater streams, or the magnitude, duration and frequency of pollutants result in varying influences on different biological attributes which are ultimately reflected by each model. Therefore, it is important to weigh the technical merits of each model and to understand their outputs within an ecological context to derive inferences on the overall biological condition.

Lastly, some discrepancies between the WY RIVPACS and WSII could be due to inappropriate use of one or more WSII bioregion indices to evaluate biological condition and/or WY RIVPACS aquatic life use attainment numeric thresholds for a given sample. This is of particular concern for samples collected on stream segments 1) located along the periphery of two or more bioregions or 2) where the majority of the upstream watershed lies in a bioregion different from the bioregion where the sample was collected. This situation likely contributed to the model bias and/or discrepancies noted earlier between the WY RIVPACS and the WSII. Ecological knowledge of the ecotone where the sample resides will assist in the selection of the appropriate WSII bioregion index and hence the appropriate WY RIVPACS bioregion aquatic life use attainment thresholds, thereby minimizing potential discrepancy in model output with the WY RIVPACS.

Aquatic Life Use Attainment

Effective evaluation of designated aquatic life use attainment requires reasonable quantifiable estimates of biological condition matched with an understanding of model interpretability and ecological knowledge. Output from the WY RIVPACS and WSII, in addition to other lines of evidence, are used by the WDEQ/WQD to help satisfy Wyoming’s obligations under the CWA. To assist in an effective evaluation of aquatic life use attainment, sample-specific aquatic life use attainment assignments from the WY RIVPACS and WSII are incorporated into a decision matrix (Figure 15) to arrive at a single attainment category for that sample. This decision matrix not only recognizes the systematic differences and technical merits between both models but also indirectly incorporates the ecological responses described under the modified Micheli et al. (1999) stressor-response framework. The result is a conservative and reasonable approach to making appropriate aquatic life use attainment decisions.

Figure 15 – Aquatic life use attainment decision matrix for the WY RIVPACS and WSII.

		WY RIVPACS		
		Aquatic Life Use Attainment Category		
		Full-Support	Indeterminate	Partial/Non-Support
WSII	Full-Support	Full-Support	Full-Support	Indeterminate
	Indeterminate	Full-Support	Indeterminate	Partial/Non-Support
	Partial/Non-Support	Indeterminate	Partial/Non-Support	Partial/Non-Support

Conclusions

The WY RIVPACS developed for Wyoming streams and rivers is a scientifically defensible tool that provides consistent and accurate assessments of biological condition at varying spatial scales. The WY RIVPACS detects modest anthropogenic disturbance with relatively high precision though remains resilient to natural temporal variability. This model should not be viewed as a ‘black box’ but rather

should be used in conjunction with other pertinent biological assessment tools such as the WSII as well as physical and chemical data to evaluate biological condition. Though all models have limitations and room for improvement, the WY RIVPACS continues to be a reliable tool in the determination of aquatic life use support as well as the evaluation of watershed improvement projects as they relate to biological condition.

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Appreciation is extended to the numerous staff (past and present) of the Wyoming Department of Environmental Quality – Water Quality Division who provided useful information in development of the model, conducted the field sampling, data entry, and/or quality assurance and quality control. This report was greatly improved with comments and recommendations from Jeremy ZumBerge with the Wyoming Department of Environmental Quality – Water Quality Division and Dr. Charles Hawkins with Utah State University.

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Appendix A – Criteria used in the selection of minimally or least-impacted reference reaches.

Identify whether the following are present in the stream reach or contributing watershed upstream of the reach. For reference consideration, streams must meet the applicable criteria.

	Mountains	Plains and Basin
1. WYPDES Point discharges present	None	≥ 3 stream miles upstream of reach and contributes ≤1% of stream flow at baseflow
2. Hazardous waste sites or landfills	None	None
3. Mines or oil fields	None	≥ 3 stream miles upstream of reach and contributes ≤1% of stream flow at baseflow
4. Feedlots, poultry farms or hatcheries	None	No feedlots allowed though if hatcheries present, then must meet criteria 1
5. Urban, industrial, commercial or residential land use	None (excludes single dwellings)	None (excludes single dwellings)
6. Channelization due to humans	Occurred >15 years ago and stream has stabilized	Occurred >15 years ago and stream has stabilized
7. Dams (does not include beaver)	> 25 stream miles upstream of reach	> 25 stream miles upstream of reach
8. Logged or burned forests	≥80% of watershed not logged or burned	≥80% of watershed not logged or burned
9. Intensively grazed or cropped lands	Proper range and crop management evident and meets criteria 15-26	Proper range and crop management evident and meets criteria 15-26

Stream reach must meet any of the five for mountainous regions. For plains and basin regions, generally one of the five must be met though exceptions are made for least impacted reference conditions.

- 10. Agricultural or range oases?
- 11. Old growth forests, woodlots?
- 12. Roadless areas?
- 13. Areas with distant or disconnected roads?
- 14. Preserves, refuges, exclosures?

Accounting for natural factors related to region and stream type, does the stream reach have: (must receive a yes to all questions, though exceptions can be made for least-impacted reference conditions).

- 15. Extensive riparian vegetation (providing buffer) and old vegetation (woody debris and overhanging material)?
- 16. Complex riparian structure (canopy, understory, ground cover)?
- 17. Complex channel morphology (mixture of habitat types)?
- 18. Minimal shoreline modification (rip-rap, vegetation removal, exotic plants)?
- 19. Complex habitat structure (variable substrate, woody debris, undercut banks, overhanging vegetation)?
- 20. Minimal chemical stressors?
- 21. Minimal channel/flow manipulation (control structures, irrigation withdrawals and/or returns, field drains, levees)?
- 22. Minimal sedimentation and turbidity?
- 23. No water sheen, minimal odors, films, scums?
- 24. Evident wildlife (including fishes) and benthos?
- 25. Minimal evidence of humans and human activity?
- 26. Minimal evidence of livestock?

[^]Wyoming Pollutant Discharge Elimination System

Appendix B- Operational taxonomic units (OTUs) derived from the 1993-2009 dataset. OTUs that occurred at samples in the reference calibration dataset are in bold.

Operational Taxonomic Unit	Taxa Group	Operational Taxonomic Unit	Taxa Group
Ablabesmyia	Diptera	Clinocera	Diptera
Acari	Trombidiformes	Coenagrionidae	Odonata
Acentrella	Ephemeroptera	Conchapelopia	Diptera
Acerpenna	Ephemeroptera	Constempellina	Diptera
Acricotopus	Diptera	Corduliidae	Odonata
Acroneuria	Plecoptera	Corixidae	Hemiptera
Aeshnidae	Odonata	Corynoneura	Diptera
Agapetus	Trichoptera	Cricotopus_bicinctus	Diptera
Agraylea	Trichoptera	Cricotopus_brevipalpus	Diptera
Alotanypus	Diptera	Cricotopus_Cricotopus	Diptera
Ambryus	Hemiptera	Cricotopus_Isocladius	Diptera
Ameletus	Ephemeroptera	Cricotopus_Nostoccladius	Diptera
Ametropodidae	Ephemeroptera	Cricotopus_Obnixus	Diptera
Amiocentrus	Trichoptera	Cricotopus_Tremulus	Diptera
Amphicosmoecus	Trichoptera	Cricotopus_trifascia	Diptera
Amphinemura	Plecoptera	Cryptochironomus	Diptera
Anagapetus	Trichoptera	Cryptolabis	Diptera
Ancylidae	Basommatophora	Cryptotendipes	Diptera
Antocha	Diptera	Culoptila	Trichoptera
Apatania	Trichoptera	Cultus	Plecoptera
Apedilum	Diptera	Demicryptochironomus	Diptera
Apsectrotanypus	Diptera	Deuterophlebia	Diptera
Arctopsyche	Trichoptera	Diamesa	Diptera
Asioplax	Ephemeroptera	Dicosmoecus	Trichoptera
Atherix	Diptera	Dicranota	Diptera
Attenella	Ephemeroptera	Dicrotendipes	Diptera
Baetis	Ephemeroptera	Dipheter	Ephemeroptera
Blephariceridae	Diptera	Diplocladius	Diptera
Brachycentrus_americanus	Trichoptera	Diura	Plecoptera
Brachycentrus_occidentalis	Trichoptera	Dixidae	Diptera
Brillia	Diptera	Dolichopodidae	Diptera
Caenis	Ephemeroptera	Dolophilodes	Trichoptera
Callibaetis	Ephemeroptera	Doroneuria	Plecoptera
Calopterygidae	Odonata	Drunella_coloradensis_flavilinea	Ephemeroptera
Camelobaetidiidus	Ephemeroptera	Drunella_doddsi	Ephemeroptera
Capniidae	Plecoptera	Drunella_grandis_spinifera	Ephemeroptera
Cardiocladius	Diptera	Dryopidae	Coleoptera
Caudatella	Ephemeroptera	Dubiraphia	Coleoptera
Centroptilum	Ephemeroptera	Dytiscidae	Coleoptera
Ceraclea	Trichoptera	Ecclisomyia	Trichoptera
Ceratopogoninae	Diptera	Enchytraeidae	Haplotaaxida
Chaetocladius	Diptera	Endochironomus	Diptera
Chelifera	Diptera	Epeorus	Ephemeroptera
Cheumatopsyche	Trichoptera	Ephemerella	Ephemeroptera
Chimarra	Trichoptera	Ephemerella	Ephemeroptera
Chironomus	Diptera	Ephoron	Ephemeroptera
Chloroperlidae	Plecoptera	Ephydriidae	Diptera
Choroterpes	Ephemeroptera	Epoicocladius	Diptera
Chyranda	Trichoptera	Erioptera	Diptera
Cinygmula	Ephemeroptera	Erpobdellidae	Arhynchobdelli
Classenia	Plecoptera	Eukiefferiella	Diptera
Cladopelma	Diptera	Falceon_quilleri	Ephemeroptera
Cladotanytarsus	Diptera	Fluminicola	Neotaeniogloss
Cleptelmis	Coleoptera	Gammarus	Amphi-poda

Appendix B (cont.) - Operational taxonomic units (OTUs) derived from the 1993-2009 dataset. OTUs that occurred at samples in the reference calibration dataset are in bold.

Operational Taxonomic Unit	Taxa Group	Operational Taxonomic Unit	Taxa Group
Glossophonia	Rhynchobdellida	Marilia	Trichoptera
Glossosoma	Trichoptera	Maruina	Diptera
Glyptotendipes	Diptera	Mayatrichia	Trichoptera
Gomphidae	Odonata	Megarcys	Plecoptera
Gyrinidae	Coleoptera	Metrichia	Trichoptera
Haliplidae	Coleoptera	Metriocnemus	Diptera
Haplotaxidae	Haplotaxida	Micrasema	Trichoptera
Harnischia	Diptera	Microcylloepus	Coleoptera
Heleniella	Diptera	Micropsectra	Diptera
Helicopsyche	Trichoptera	Microtendipes	Diptera
Helobdella	Rhynchobdellida	Monodiamesa	Diptera
Helodon	Diptera	Muscidae	Diptera
Hemerodromia	Diptera	Mycetophilidae	Diptera
Heptagenia_Nixe	Ephemeroptera	Mystacides	Trichoptera
Hesperoconopa	Diptera	Naididae	Haplotaxida
Hesperoperla	Plecoptera	Nanocladius	Diptera
Hesperophylax	Trichoptera	Narpus	Coleoptera
Heterlimnius	Coleoptera	Nectopsyche	Trichoptera
Heterotrissocladius	Diptera	Nematoda	Nematoda
Hexagenia	Ephemeroptera	Nemoura	Plecoptera
Hexatoma	Diptera	Neochoroterpes	Ephemeroptera
Hirudinidae	Arhynchobdellida	Neoelmis	Coleoptera
Hyaella	Amphipoda	Neophylax	Trichoptera
Hydatophylax	Trichoptera	Neoplasta	Diptera
Hydraenidae	Coleoptera	Neothremma	Trichoptera
Hydrobaenus	Diptera	Neotrichia	Trichoptera
Hydrobiidae	Prosobranchia	Neureclipsis	Trichoptera
Hydrophilidae	Coleoptera	Nilotanypus	Diptera
Hydropsyche	Trichoptera	Nimbocera	Diptera
Hydroptila	Trichoptera	Ochrotrichia	Trichoptera
Isogenoides	Plecoptera	Odontomesa	Diptera
Isonychiidae	Ephemeroptera	Oecetis	Trichoptera
Isoperla	Plecoptera	Oligoneuriidae	Ephemeroptera
Ithytrichia	Trichoptera	Oligophlebodes	Trichoptera
Kogotus	Plecoptera	Onocosmoecus	Trichoptera
Krenosmittia	Diptera	Optioservus	Coleoptera
Labrundinia	Diptera	Ordobrevia	Coleoptera
Lara	Coleoptera	Oreogeton	Diptera
Larsia	Diptera	Ormosia	Diptera
Lauterborniella	Diptera	Orthocladius	Diptera
Lepidostoma	Trichoptera	Oxyethira	Trichoptera
Leptophlebia	Ephemeroptera	Pagastia	Diptera
Lestidae	Odonata	Parachaetocladius	Diptera
Leucotrichia	Trichoptera	Parachironomus	Diptera
Leucrocuta	Ephemeroptera	Paracladius	Diptera
Leuctridae	Plecoptera	Paracladopelma	Diptera
Libellulidae	Odonata	Paracloeodes	Ephemeroptera
Limnephilus	Trichoptera	Parakiefferiella	Diptera
Limnophila	Diptera	Paralauterborniella	Diptera
Limnophyes	Diptera	Paraleptophlebia	Ephemeroptera
Limonia	Diptera	Paramerina	Diptera
Lopescladius	Diptera	Parametriocnemus	Diptera
Lumbricidae	Haplotaxida	Paraphaenocladius	Diptera
Lumbriculidae	Lumbriculida	Parapsyche	Trichoptera
Lymnaeidae	Basommatophora	Paratanytarsus	Diptera
Macropelopia	Diptera	Paratendipes	Diptera
Malenka	Plecoptera	Paratrichocladius	Diptera

Appendix B (cont.) - Operational taxonomic units (OTUs) derived from the 1993-2009 dataset. OTUs that occurred at samples in the reference calibration dataset are in bold.

Operational Taxonomic Unit	Taxa Group	Operational Taxonomic Unit	Taxa Group
Paratrissocladius	Diptera	Rhyacophila_verrula	Trichoptera
Parorthocladius	Diptera	Rhyacophila_vofixa	Trichoptera
Pelecorhynchidae	Diptera	Rickera	Plecoptera
Peltoperlidae	Plecoptera	Robackia	Diptera
Pentaneura	Diptera	Saetheria	Diptera
Pericoma	Diptera	Sciomyzidae	Diptera
Perlinodes	Plecoptera	Serratella	Ephemeroptera
Petrophila	Lepidoptera	Sialis	Megaloptera
Phaenopsectra	Diptera	Simulium	Diptera
Phryganeidae	Trichoptera	Siphonuridae	Ephemeroptera
Physidae	Basommatophora	Skwala	Plecoptera
Pisidiidae	Veneroidea	Sphaeriidae	Veneroidea
Planorbidae	Basommatophora	Stactobiella	Trichoptera
Plauditus	Ephemeroptera	Stempellina	Diptera
Polycentropus	Trichoptera	Stempellinella	Diptera
Polypedilum	Diptera	Stenacron	Ephemeroptera
Potthastia	Diptera	Stenelmis	Coleoptera
Procladius	Diptera	Stenochironomus	Diptera
Prodiamesa	Diptera	Stenonema	Ephemeroptera
Prosimulium	Diptera	Stictochironomus	Diptera
Prostoia	Plecoptera	Stilocladius	Diptera
Protoptila	Trichoptera	Stratiomyidae	Diptera
Psectrocladius	Diptera	Sublettea	Diptera
Psectrotanypus	Diptera	Symposiocladius	Diptera
Pseudochironomus	Diptera	Sympotthastia	Diptera
Pseudocloeon	Ephemeroptera	Synorthocladius	Diptera
Pseudodiamesa	Diptera	Syrphidae	Diptera
Pseudorthocladius	Diptera	Tabanidae	Diptera
Pseudosmittia	Diptera	Taeniopterygidae	Plecoptera
Psilometriocnemus	Diptera	Tanyderidae	Diptera
Psychoda	Diptera	Tanypus	Diptera
Psychoglypha	Trichoptera	Tanytarsus	Diptera
Psychomyiidae	Trichoptera	Thaumaleidae	Diptera
Pteronarcella	Plecoptera	Thienemanniella	Diptera
Pteronarcys	Plecoptera	Thienemannimyia	Diptera
Ptychopteridae	Diptera	Timpanoga	Ephemeroptera
Pycnopsyche	Trichoptera	Tipula	Diptera
Radotanypus	Diptera	Traverella	Ephemeroptera
Reomyia	Diptera	Triaenodes	Trichoptera
Rheocricotopus	Diptera	Tribelos	Diptera
Rheosmittia	Diptera	Tricorythodes	Ephemeroptera
Rheotanytarsus	Diptera	Turbellaria	Tricladida
Rhithrogena	Ephemeroptera	Tvetenia	Diptera
Rhyacophila_Alberta	Trichoptera	Unionidae	Unionoidea
Rhyacophila_angelita	Trichoptera	Visoka	Plecoptera
Rhyacophila_betteni	Trichoptera	Wiedemannia	Diptera
Rhyacophila_blarina	Trichoptera	Wormaldia	Trichoptera
Rhyacophila_brunnea	Trichoptera	Xenochironomus	Diptera
Rhyacophila_coloradensis	Trichoptera	Ylodes	Trichoptera
Rhyacophila_cyalinata	Trichoptera	Zaitzevia	Coleoptera
Rhyacophila_hyalinata	Trichoptera	Zapada_cinctipes	Plecoptera
Rhyacophila_iranda	Trichoptera	Zapada_columbiana	Plecoptera
Rhyacophila_narvae	Trichoptera	Zapada_frigida	Plecoptera
Rhyacophila_nevadensis	Trichoptera	Zapada_oregonensis	Plecoptera
Rhyacophila_pellisa	Trichoptera	Zavreliomyia	Diptera
Rhyacophila_rotunda	Trichoptera		
Rhyacophila_vagrita	Trichoptera		

Appendix C – WY RIVPACS O/E values and narrative ratings for 1993-2009 samples. Asterisks designate samples that were outside model experience.

SAMPLEID	STATIONID	WATERBODY NAME	COLLECTION DATE	LAT(N)	LONG(W)	2011 BIOREGION	O	E	OE	NARRATIVE RATING
804	WB66	ALBERT CREEK - UPPER	10/7/1998	41.47652500	-110.62250833	WYOMING BASIN	6	12.64151922	0.47462650	PARTIAL/NON SUPPORT
1186	MRW113	Alice Creek White Saddle	9/6/2000	42.41388880	-110.72361110	SEDIMENTARY MOUNTAINS	9	9.20712075	0.97750429	FULL SUPPORT
773	WB35	ALKALI CREEK - Bridge Abutment (Lower)	10/14/1998	41.61753333	-109.57735278	WYOMING BASIN	2	8.80703072	0.22709129	* PARTIAL/NON SUPPORT
1103	WB134	Alkali Creek above Rd. 16	10/24/2001	44.73060556	-108.89167778	WYOMING BASIN	2	8.18229274	0.24443027	PARTIAL/NON SUPPORT
1102	WB133	Alkali Creek above Shoshone	10/24/2001	44.71513889	-108.84962222	WYOMING BASIN	6	9.12667922	0.65741327	INDETERMINATE
126	MRW58	ANTELOPE CREEK	9/14/1994	44.86944444	-110.38361111	VOLCANIC MOUNTAINS & VALLEYS	11	12.69979734	0.86615555	FULL SUPPORT
1645	MRW58	ANTELOPE CREEK	9/27/2006	44.86944444	-110.38361111	VOLCANIC MOUNTAINS & VALLEYS	8	12.71584278	0.62913644	PARTIAL/NON SUPPORT
1682	WB253	ARKANSAS CREEK - NE FERRIS	8/2/2006	42.26872298	-107.21390415	SOUTHERN FOOTHILLS & LARAMIE RANGE	14	15.23204784	0.91911476	FULL SUPPORT
1893	WB0332	Baldwin Creek-5600	9/22/2009	42.84678333	-108.79858980	HIGH VALLEYS	9	9.32667081	0.96497455	FULL SUPPORT
391	SR25	BATES CREEK	10/6/1997	42.52916667	-106.24722222	WYOMING BASIN	8	8.58152968	0.93223473	FULL SUPPORT
1084	MRC95	Battle Creek below headwaters	9/11/2001	44.51233889	-107.49489444	SEDIMENTARY MOUNTAINS	5	13.46227571	0.37140823	PARTIAL/NON SUPPORT
958	WHP18	BEAR CREEK - ABOVE DATER CREEK (BC5)	10/14/1999	41.65210278	-104.37569444	SE PLAINS	7	8.92856589	0.78400049	FULL SUPPORT
1107	WHP18	BEAR CREEK - ABOVE DATER CREEK (BC5)	10/17/2001	41.65210278	-104.37569444	SE PLAINS	6	8.92856590	0.67200042	INDETERMINATE
1039	SR28	BEAR CREEK - ABOVE F.S. ROAD 543	9/27/2000	41.21390833	-106.27056667	SOUTHERN ROCKIES	16	18.75420330	0.85314208	INDETERMINATE
1742	SR28	BEAR CREEK - ABOVE F.S. ROAD 543	9/20/2007	41.21390833	-106.27056667	SOUTHERN ROCKIES	15	18.73760345	0.80052927	INDETERMINATE
957	WHP17	BEAR CREEK - ABOVE FOX CREEK (BC4)	10/15/1999	41.65861389	-104.32133889	SE PLAINS	7	8.92856682	0.78400040	FULL SUPPORT
961	WHP21	BEAR CREEK - ABOVE LITTLE BEAR CREEK (BC8)	10/20/1999	41.61624167	-104.61689167	SE PLAINS	7	8.92854827	0.78400203	FULL SUPPORT
1108	WHP21	BEAR CREEK - ABOVE LITTLE BEAR CREEK (BC8)	10/25/2001	41.61624167	-104.61689167	SE PLAINS	6	8.92854303	0.67200214	INDETERMINATE
1280	WHP21	BEAR CREEK - ABOVE LITTLE BEAR CREEK (BC8)	10/15/2002	41.61624167	-104.61689167	SE PLAINS	7	8.92854592	0.78400224	FULL SUPPORT
1377	WHP21	BEAR CREEK - ABOVE LITTLE BEAR CREEK (BC8)	10/15/2003	41.61624167	-104.61689167	SE PLAINS	9	8.92854592	1.00800288	FULL SUPPORT
1040	SR29	BEAR CREEK - BELOW F.S. ROAD 500E	9/27/2000	41.21300000	-106.29192500	SOUTHERN ROCKIES	16	18.75495586	0.85310785	INDETERMINATE
1779	SR29	BEAR CREEK - BELOW F.S. ROAD 500E	9/19/2007	41.21300000	-106.29192500	SOUTHERN ROCKIES	14	18.73991704	0.74706841	INDETERMINATE
956	WHP16	BEAR CREEK - BELOW FOX CREEK (BC3)	10/15/1999	41.65443056	-104.29721111	SE PLAINS	6	8.92856825	0.67200024	INDETERMINATE
960	WHP20	BEAR CREEK - BELOW LITTLE BEAR CREEK (BC7)	10/19/1999	41.61605556	-104.60957500	SE PLAINS	8	8.92855799	0.89600135	FULL SUPPORT
1109	WHP20	BEAR CREEK - BELOW LITTLE BEAR CREEK (BC7)	10/18/2001	41.61605556	-104.60957500	SE PLAINS	7	8.92855506	0.78400144	FULL SUPPORT
1279	WHP20	BEAR CREEK - BELOW LITTLE BEAR CREEK (BC7)	10/15/2002	41.61605556	-104.60957500	SE PLAINS	8	8.92855670	0.89600148	FULL SUPPORT
955	WHP15	BEAR CREEK - BELOW LOVERCHECK DIVERSION DITCH (BC2)	10/13/1999	41.63886111	-104.22800556	SE PLAINS	9	8.92856879	1.00800030	FULL SUPPORT
959	WHP19	BEAR CREEK - BELOW SPRING RUN (BC6)	10/19/1999	41.63595278	-104.47532500	SE PLAINS	11	8.92856405	1.23200102	FULL SUPPORT
962	WHP22	BEAR CREEK - HEADWATER (BC9)	10/21/1999	41.63225278	-104.74628056	SE PLAINS	8	8.92853980	0.89600317	FULL SUPPORT
935	WB84	Bear Creek Lower (Bearpole)	9/15/1999	43.58562778	-109.45646667	HIGH VALLEYS	11	11.79779842	0.93237735	FULL SUPPORT
954	WHP14	BEAR CREEK - NEAR MOUTH (BC1)	10/12/1999	41.63653333	-104.22511389	SE PLAINS	6	8.92856918	0.67200017	INDETERMINATE
861	MRW91	Bear Creek (Upper) Bear Basin	9/13/1999	43.73471389	-109.44759722	VOLCANIC MOUNTAINS & VALLEYS	9	9.63655706	0.93394352	FULL SUPPORT
860	MRW90	Bear Creek Middle (Campground)	9/14/1999	43.64443056	-109.49986944	HIGH VALLEYS	7	8.94938803	0.78217639	INDETERMINATE
780	WB42	BEAR RIVER - BURTON	10/21/1998	41.04343889	-110.93235556	HIGH VALLEYS	13	12.54786094	1.03603316	FULL SUPPORT
781	WB43	BEAR RIVER - FIELD	10/21/1998	41.16600278	-110.88062778	HIGH VALLEYS	13	11.78681346	1.10292744	FULL SUPPORT
783	WB45	BEAR RIVER - MARTIN RANCH	10/21/1998	41.41576389	-111.01650556	HIGH VALLEYS	12	12.12090439	0.99002513	FULL SUPPORT
782	WB44	BEAR RIVER - State PARK	10/20/1998	41.26036944	-110.93524444	HIGH VALLEYS	11	12.16231341	0.90443320	FULL SUPPORT
1195	WB104	Bear River Woodruff	8/29/2000	41.52035833	-111.02233889	HIGH VALLEYS	6	12.12064106	0.49502332	PARTIAL/NON SUPPORT
259	WB117	BEAR RIVER 1 - LOWER	10/11/1994	41.16777778	-110.87916667	HIGH VALLEYS	11	11.83755391	0.92924603	FULL SUPPORT
256	WB116	BEAR RIVER 1 - UPPER	10/11/1994	41.04361111	-110.93166667	HIGH VALLEYS	12	12.56475767	0.95505224	FULL SUPPORT
257	WB116	BEAR RIVER 1 - UPPER	10/5/1995	41.04361111	-110.93166667	HIGH VALLEYS	10	12.55830626	0.79628572	INDETERMINATE
258	WB116	BEAR RIVER 1 - UPPER	9/24/1996	41.04361111	-110.93166667	HIGH VALLEYS	13	12.55583800	1.03537494	FULL SUPPORT
260	WB118	BEAR RIVER 2 - LOWER	10/13/1994	41.35277778	-111.00972222	HIGH VALLEYS	9	12.12656057	0.74217252	INDETERMINATE
254	WB11	BEAR RIVER 2 - UPPER (Nixon)	10/11/1994	41.31480833	-111.00919722	HIGH VALLEYS	7	12.12946330	0.57710715	PARTIAL/NON SUPPORT
816	WB11	BEAR RIVER 2 - UPPER (Nixon)	10/21/1998	41.31480833	-111.00919722	HIGH VALLEYS	12	12.12612084	0.98959924	FULL SUPPORT
930	WB79	Bear River Border	10/21/1999	42.19583333	-111.04194444	HIGH VALLEYS	9	12.22992422	0.73589990	INDETERMINATE
831	MRC39A	Bear Trap Creek in Bear Trap Meadow	10/1/1999	43.90550000	-107.03055556	SEDIMENTARY MOUNTAINS	3	6.86997402	0.43668287	PARTIAL/NON SUPPORT
42	MRC9	BEARTRAP CREEK	10/22/1993	43.90777778	-107.03027778	SEDIMENTARY MOUNTAINS	11	14.00831855	0.78524771	INDETERMINATE

Assessment of Aquatic Biological Condition Using WY RIVPACS with Comparisons to the Wyoming Stream Integrity Index (WSII)

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SAMPLEID	STATIONID	WATERBODY NAME	COLLECTION DATE	LAT(N)	LONG(W)	2011 BIOREGION	O	E	OE	NARRATIVE RATING
623	MRC39	BEARTRAP CREEK	8/19/1998	43.90380556	-107.02985556	SEDIMENTARY MOUNTAINS	10	13.48906943	0.74134098	INDETERMINATE
1288	MRC9	BEARTRAP CREEK	9/9/2002	43.90550000	-107.03055556	SEDIMENTARY MOUNTAINS	10	14.00514052	0.71402354	INDETERMINATE
934	WB83	Beason Creek (Day) Above Willow Confluence	10/27/1999	42.72676944	-108.70244167	HIGH VALLEYS	9	8.02087541	1.12207204	FULL SUPPORT
83	MRE15	BEAVER CREEK	10/3/1996	44.57250000	-104.40666667	BLACK HILLS	7	9.32416969	0.75073709	INDETERMINATE
864	MRW94	Beaver Creek Miners Delight	8/11/1999	42.53511111	-108.65072500	SEDIMENTARY MOUNTAINS	8	8.58925099	0.93139670	FULL SUPPORT
1623	MRW94	Beaver Creek Miners Delight	8/9/2005	42.53511111	-108.65072500	SEDIMENTARY MOUNTAINS	10	8.70083728	1.14931468	FULL SUPPORT
1034	MRE14	Beaver Creek - Above Cook Lake	10/18/2000	44.56231944	-104.40585278	BLACK HILLS	6	9.32145721	0.64367618	INDETERMINATE
1033	MRE15	Beaver Creek - Above Fawn Creek	10/18/2000	44.64112500	-104.38390556	BLACK HILLS	6	9.50474532	0.63126363	INDETERMINATE
1032	MRE16	Beaver Creek - Above Little Creek	8/31/2000	44.60758333	-104.39846944	BLACK HILLS	5	9.93942951	0.50304698	PARTIAL/NON SUPPORT
873	NGP44	Beaver Creek - Lower	10/27/1999	43.98680278	-106.68656944	HIGH VALLEYS	10	9.65275060	1.03597414	FULL SUPPORT
863	MRW93	Beaver Creek Upper (Iron Mtn)	8/13/1999	42.56602778	-108.73459722	SEDIMENTARY MOUNTAINS	12	11.04220822	1.08673915	FULL SUPPORT
1616	MRW93	Beaver Creek Upper (Iron Mtn)	8/8/2005	42.56602778	-108.73459722	SEDIMENTARY MOUNTAINS	9	9.86484894	0.91233024	FULL SUPPORT
328	WBI9	BEAVER CREEK - WOOLERY RANCH	9/26/1997	42.51694444	-108.40000000	WYOMING BASIN	6	5.33835328	1.12394210	FULL SUPPORT
1092	NGP141	Beaver Creek below Stockade Beaver Creek	9/26/2001	43.54043611	-104.12262778	NE PLAINS	6	8.92854746	0.67200180	INDETERMINATE
1647	NGP141	Beaver Creek below Stockade Beaver Creek	8/28/2006	43.54043611	-104.12262778	NE PLAINS	5	8.92855779	0.56000086	INDETERMINATE
938	WB87	Beaver Creek Lower, Confluence	8/12/1999	42.51862500	-108.49759167	WYOMING BASIN	8	8.60964250	0.92919073	FULL SUPPORT
1615	WB87	Beaver Creek Lower, Confluence	8/10/2005	42.51862500	-108.49759167	WYOMING BASIN	7	7.85727213	0.89089443	FULL SUPPORT
1091	NGP140	Beaver Creek near South Dakota state line	9/27/2001	43.50334167	-104.05908056	NE PLAINS	5	8.92855581	0.56000098	INDETERMINATE
910	NGP81	Beaver Creek on School Section	9/30/1999	43.65609722	-106.88446111	BIGHORN BASIN FOOTHILLS	8	13.50631072	0.59231571	PARTIAL/NON SUPPORT
365	MRE6	BEAVERDAM CREEK	10/22/1997	44.71500000	-104.38638889	BLACK HILLS	4	9.59292270	0.41697407	PARTIAL/NON SUPPORT
1296	NGP0171	Belle Fourche River	9/24/2002	44.93778333	-104.34455556	NE PLAINS	6	8.92856323	0.67200062	INDETERMINATE
1936	MRE0026	Belle Fourche- Gantz	9/22/2009	44.76413000	-104.50226600	NE PLAINS	9	8.92855296	1.00800209	FULL SUPPORT
1295	NGP0172	Belle Fourche River	9/24/2002	44.88158611	-104.24993611	NE PLAINS	6	8.92856577	0.67200043	INDETERMINATE
1297	NGP0173	Belle Fourche River	9/25/2002	44.82223333	-104.21202500	NE PLAINS	6	8.92856625	0.67200039	INDETERMINATE
189	NGP3	BELLE FOURCHE RIVER - BLM	10/5/1994	44.75277778	-104.49055556	NE PLAINS	10	8.92855184	1.12000246	FULL SUPPORT
1294	NGP3	BELLE FOURCHE RIVER - BLM	9/23/2002	44.75277778	-104.49055556	NE PLAINS	6	8.92856190	0.67200072	INDETERMINATE
1935	NGP3	BELLE FOURCHE RIVER - BLM	9/21/2009	44.75277778	-104.49055556	NE PLAINS	8	8.92855411	0.89600174	FULL SUPPORT
197	NGP17	BELLE FOURCHE RIVER - DEVILS TOWER	9/21/1994	44.58916667	-104.70055556	NE PLAINS	8	8.92854228	0.89600292	FULL SUPPORT
745	NGP138	BELLE FOURCHE RIVER - DOWNSTREAM OF DONKEY CREEK	10/1/1998	44.29051111	-104.97133333	NE PLAINS	7	8.92856266	0.78400077	FULL SUPPORT
748	NGP140	BELLE FOURCHE RIVER - DOWNSTREAM OF HULETT WWTF	9/2/1998	44.69906944	-104.59213889	NE PLAINS	7	8.92854900	0.78400197	FULL SUPPORT
746	NGP139	BELLE FOURCHE RIVER - DOWNSTREAM OF RUSH CREEK	9/23/1998	44.27652500	-104.97213889	NE PLAINS	6	8.92855860	0.67200097	INDETERMINATE
749	NGP141	BELLE FOURCHE RIVER - UPSTREAM OF HULETT WWTF	9/2/1998	44.69428611	-104.59465833	NE PLAINS	7	8.92854880	0.78400199	FULL SUPPORT
699	NGP12	BELLE FOURCHE RIVER - UPSTREAM OF RAVEN CREEK	9/24/1998	44.18029444	-105.09141944	NE PLAINS	7	8.92855045	0.78400184	FULL SUPPORT
994	NGP116	Belle Fourche River Below Caballo Creek	8/24/2000	44.07905833	-105.23781667	NE PLAINS	6	8.92852881	0.67200321	INDETERMINATE
202	NGP121	BIG GOOSE CREEK	10/25/1994	44.79522222	-106.96559444	HIGH VALLEYS	8	11.36014674	0.70421626	INDETERMINATE
737	NGP121	BIG GOOSE CREEK	10/29/1998	44.79522222	-106.96559444	HIGH VALLEYS	12	10.86588632	1.10437379	FULL SUPPORT
1631	NGP121	BIG GOOSE CREEK	10/27/2004	44.79522222	-106.96559444	HIGH VALLEYS	7	9.09271585	0.76984700	INDETERMINATE
755	NGP147	Big Goose Creek - Beckton	10/22/1998	44.74544722	-107.12875000	HIGH VALLEYS	11	10.41550927	1.05611735	FULL SUPPORT
678	MRC148	Big Goose Creek - Canyon (T-T Ranch)	10/22/1998	44.69918611	-107.18516111	HIGH VALLEYS	10	13.45437712	0.74325254	INDETERMINATE
756	NGP149	Big Goose Creek - Normative Services	10/23/1998	44.77363056	-107.01981389	HIGH VALLEYS	12	9.80177423	1.22426815	FULL SUPPORT
1636	NGP0180	Big Goose Creek (Station 3743)	10/27/2004	44.80108611	-106.96322778	HIGH VALLEYS	5	9.06754634	0.55141709	PARTIAL/NON SUPPORT
181	MRW141	BIG SANDY RIVER Leckie	9/27/1996	42.57250000	-109.29111111	HIGH VALLEYS	14	11.58320697	1.20864628	FULL SUPPORT
1724	MRW141	BIG SANDY RIVER Leckie	9/25/2007	42.57250000	-109.29111111	HIGH VALLEYS	12	13.71899201	0.87469983	FULL SUPPORT
797	WB59	BIG SANDY RIVER - LOWER	9/10/1998	41.88551667	-109.77166111	WYOMING BASIN	5	12.56530449	0.39792112	PARTIAL/NON SUPPORT
796	WB58	BIG SANDY RIVER - MIDDLE	9/9/1998	42.01117778	-109.58005833	WYOMING BASIN	7	13.03381272	0.53706464	PARTIAL/NON SUPPORT
795	WB57	BIG SANDY RIVER - UPPER	9/10/1998	42.07258056	-109.48381944	WYOMING BASIN	8	12.96764136	0.61692021	PARTIAL/NON SUPPORT
47	MRC125	BIG WILLOW CREEK	9/8/1993	44.76555556	-107.54027778	SEDIMENTARY MOUNTAINS	12	13.62082795	0.88100371	FULL SUPPORT
630	MRC46	Big Willow Creek - Above Hwy 14A	9/1/1998	44.76462778	-107.54130556	SEDIMENTARY MOUNTAINS	13	13.59738633	0.95606609	FULL SUPPORT

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SAMPLEID	STATIONID	WATERBODY NAME	COLLECTION DATE	LAT(N)	LONG(W)	2011 BIOREGION	O	E	OE	NARRATIVE RATING
1261	MRC46	Big Willow Creek - Above Hwy 14A	7/11/2002	44.76462778	-107.54130556	SEDIMENTARY MOUNTAINS	11	13.61553813	0.80790050	INDETERMINATE
1379	MRC46	Big Willow Creek - Above Hwy 14A	8/26/2003	44.76462778	-107.54130556	SEDIMENTARY MOUNTAINS	13	13.60644620	0.95542949	FULL SUPPORT
631	MRC47	Big Willow Creek - Upper	9/1/1998	44.73092222	-107.56103611	SEDIMENTARY MOUNTAINS	11	13.53151286	0.81291723	INDETERMINATE
1362	MRC47	Big Willow Creek - Upper	8/26/2003	44.73092222	-107.56103611	SEDIMENTARY MOUNTAINS	12	13.53342364	0.88669359	FULL SUPPORT
1303	WB0213	Bighorn River	10/7/2002	44.34295833	-108.01254444	WYOMING BASIN	7	9.08764903	0.77027623	* INDETERMINATE
1559	WB0248	Bighorn River	10/25/2005	44.03653056	-107.95843055	WYOMING BASIN	8	10.18479674	0.78548450	* INDETERMINATE
1333	WB0192	Bighorn River Below Gooseberry	10/7/2002	43.92170833	-108.05676111	WYOMING BASIN	8	10.16804367	0.78677868	* INDETERMINATE
1268	WB0194	Bighorn River Durkee	10/3/2002	44.12828056	-107.92752778	WYOMING BASIN	6	8.43983815	0.71091411	* INDETERMINATE
1306	WB0193	Bighorn River Goose Island	10/2/2002	44.25795556	-107.94961667	WYOMING BASIN	6	8.43191202	0.71158238	* INDETERMINATE
1307	WB0195	Bighorn River Neiber	10/8/2002	43.90886111	-108.06865000	WYOMING BASIN	6	9.60927107	0.62439700	* PARTIAL/NON SUPPORT
1332	WB0191	Bighorn River Nowood	10/1/2002	44.28298611	-107.98595556	WYOMING BASIN	7	10.16552472	0.68860194	* INDETERMINATE
1311	WB0190	Bighorn River Sixmile	10/30/2002	44.14443333	-107.92735556	WYOMING BASIN	5	8.47875293	0.58970936	* PARTIAL/NON SUPPORT
1454	WB0233	Bighorn River Nowater	7/27/2004	43.98362222	-107.98961944	WYOMING BASIN	7	9.09636921	0.76953781	* INDETERMINATE
1302	WB0217	Bighorn River - downstream town Greybull	10/3/2002	44.54305833	-108.06910556	WYOMING BASIN	8	10.16039318	0.78737110	* INDETERMINATE
1300	WB0215	Bighorn River - Greybull Park	10/1/2002	44.48023056	-108.04833889	WYOMING BASIN	7	9.60206802	0.72900962	* INDETERMINATE
1301	WB0214	Bighorn River -upstream Greybull R. Confluence	10/2/2002	44.44626111	-108.04121389	WYOMING BASIN	7	9.05675496	0.77290376	* INDETERMINATE
1356	SR0037	Billie Creek, West Fork - Above Gully	10/7/2003	41.08692000	-106.72161300	SOUTHERN ROCKIES	13	18.75860621	0.69301524	INDETERMINATE
1376	SR0036	Billie Creek, West Fork - Blowout	10/7/2003	41.08765800	-106.72011800	SOUTHERN ROCKIES	17	18.75852396	0.90625467	FULL SUPPORT
702	NGP15	Billy Creek - Lower	9/25/1998	44.12734167	-106.71169722	HIGH VALLEYS	7	9.27380089	0.75481457	INDETERMINATE
771	WB33	BITTER CREEK - KANDA (MIDDLE)	8/19/1998	41.52653056	-109.35785833	WYOMING BASIN	0	11.87920509	0.00000000	PARTIAL/NON SUPPORT
770	WB32	BITTER CREEK - LOWER	8/18/1998	41.51741389	-109.42852500	WYOMING BASIN	4	11.50182651	0.34777085	PARTIAL/NON SUPPORT
772	WB34	BITTER CREEK - UPPER	8/19/1998	41.59638889	-109.14615278	WYOMING BASIN	5	11.77167974	0.42474822	PARTIAL/NON SUPPORT
1060	NGP118	Black Thunder Creek above Little Thunder Creek	9/23/2000	43.66111111	-104.87694444	NE PLAINS	3	8.92848161	0.33600338	PARTIAL/NON SUPPORT
1065	NGP121	Black Thunder Creek at gage	9/19/2000	43.58189722	-104.72072500	NE PLAINS	4	8.92853996	0.44800158	PARTIAL/NON SUPPORT
810	WB73	BLACKS FORK - BELOW GRANGER (GREEN RIVER)	10/27/1998	41.60287222	-109.91109444	WYOMING BASIN	9	12.37421364	0.72731894	INDETERMINATE
1539	WB73	BLACKS FORK - BELOW GRANGER (GREEN RIVER)	10/21/2004	41.60287222	-109.91109444	WYOMING BASIN	3	12.39441104	0.24204458	PARTIAL/NON SUPPORT
812	WB75	BLACKS FORK - FLAMING GORGE (GREEN RIVER)	10/27/1998	41.41334444	-109.62971111	WYOMING BASIN	8	12.09247189	0.66156862	INDETERMINATE
1537	WB75	BLACKS FORK - FLAMING GORGE (GREEN RIVER)	10/20/2004	41.41334444	-109.62971111	WYOMING BASIN	4	11.60543464	0.34466611	PARTIAL/NON SUPPORT
809	WB72	BLACKS FORK - VERNE (GREEN RIVER)	10/28/1998	41.58382778	-110.00424444	WYOMING BASIN	5	13.29495251	0.37608258	PARTIAL/NON SUPPORT
1540	WB72	BLACKS FORK - VERNE (GREEN RIVER)	10/26/2004	41.58382778	-110.00424444	WYOMING BASIN	3	13.29520770	0.22564522	PARTIAL/NON SUPPORT
811	WB74	BLACKS FORK - INTERSTATE (GREEN RIVER)	10/27/1998	41.53456111	-109.68764444	WYOMING BASIN	6	12.15080985	0.49379425	PARTIAL/NON SUPPORT
1538	WB74	BLACKS FORK - INTERSTATE (GREEN RIVER)	10/20/2004	41.53456111	-109.68764444	WYOMING BASIN	4	11.66715228	0.34284287	PARTIAL/NON SUPPORT
1541	WB0236	Blacks Fork River Gaging Station	10/27/2004	41.45557222	-110.17575833	WYOMING BASIN	4	14.00101288	0.28569362	PARTIAL/NON SUPPORT
1542	WB0237	Blacks Fork River Overland	10/28/2004	41.63573333	-109.81203056	WYOMING BASIN	4	11.79466376	0.33913642	PARTIAL/NON SUPPORT
76	MRE8	BLACKTAIL CREEK	10/4/1996	44.56027778	-104.47694444	BLACK HILLS	5	8.14315337	0.61401275	INDETERMINATE
1046	MRE19	Blacktail Creek - Below Hershey Creek	10/25/2000	44.58300556	-104.49026389	BLACK HILLS	9	9.27989572	0.96983848	FULL SUPPORT
164	MRW125	BLACKTAIL DEER CREEK	9/9/1994	44.95694444	-110.58611111	VOLCANIC MOUNTAINS & VALLEYS	8	12.71931774	0.62896455	PARTIAL/NON SUPPORT
624	MRC40	Blue Creek	8/20/1998	43.65460833	-106.90920556	BIGHORN BASIN FOOTHILLS	5	13.23166637	0.37788135	PARTIAL/NON SUPPORT
703	NGP16	Boxelder Creek - Lower	10/8/1998	44.56475833	-106.59185556	HIGH VALLEYS	6	9.20341692	0.65193178	PARTIAL/NON SUPPORT
704	NGP17	Boxelder Creek - Upper	10/8/1998	44.44059444	-106.69419444	HIGH VALLEYS	0	8.77079024	0.00000000	PARTIAL/NON SUPPORT
147	MRW9	BUFFALO FORK RIVER	8/31/1994	43.85472222	-110.23833333	SEDIMENTARY MOUNTAINS	12	10.18510031	1.17819164	FULL SUPPORT
1861	MRW9	BUFFALO FORK RIVER	8/18/2008	43.85472222	-110.23833333	SEDIMENTARY MOUNTAINS	11	10.18512598	1.08000628	FULL SUPPORT
48	MRC126	BULL CREEK	9/9/1993	44.75993889	-107.58985278	SEDIMENTARY MOUNTAINS	13	13.67216562	0.95083693	FULL SUPPORT
665	MRC126	BULL CREEK	8/26/1998	44.75993889	-107.58985278	SEDIMENTARY MOUNTAINS	11	13.65134586	0.80578136	INDETERMINATE
1363	MRC0104	BULL CREEK	8/28/2003	44.75255600	-107.59381400	SEDIMENTARY MOUNTAINS	11	13.66570272	0.80493482	INDETERMINATE
1382	MRC126	BULL CREEK	8/28/2003	44.75993889	-107.58985278	SEDIMENTARY MOUNTAINS	11	13.65070807	0.80581901	INDETERMINATE
1393	MRC0105	BULL CREEK	8/28/2003	44.74111100	-107.59319400	SEDIMENTARY MOUNTAINS	7	13.65856183	0.51249905	PARTIAL/NON SUPPORT
705	NGP18	Bull Creek - Lower (Near Buffalo)	10/9/1998	44.34747500	-106.67572500	HIGH VALLEYS	7	9.62566257	0.72722267	INDETERMINATE

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Appendix C (cont.) – WY RIVPACS O/E values and narrative ratings for 1993-2009 samples. Asterisks designate samples that were outside model experience.

SAMPLEID	STATIONID	WATERBODY NAME	COLLECTION DATE	LAT(N)	LONG(W)	2011 BIOREGION	O	E	OE	NARRATIVE RATING
633	MRC49	Bull Creek - Upper	8/27/1998	44.73987500	-107.59312778	SEDIMENTARY MOUNTAINS	9	13.63328018	0.66014927	PARTIAL/NON SUPPORT
1383	MRC49	Bull Creek - Upper	9/3/2003	44.73987500	-107.59312778	SEDIMENTARY MOUNTAINS	10	13.63555150	0.73337701	INDETERMINATE
1484	NGP184	Burger Draw	9/22/2004	44.08516700	-106.08342000	NE PLAINS	3	8.92791421	0.33602473	* PARTIAL/NON SUPPORT
997	NGP105	Caballo Creek Below Belle Ayr Mine	8/23/2000	44.09230556	-105.29985278	NE PLAINS	3	8.92848727	0.33600317	PARTIAL/NON SUPPORT
996	NGP106	Caballo Creek Below Bone Pile Creek	8/23/2000	44.08970278	-105.44541111	NE PLAINS	4	8.92854525	0.44800131	PARTIAL/NON SUPPORT
995	NGP107	Caballo Creek Below Hwy 59	8/23/2000	44.08027222	-105.46273889	NE PLAINS	2	8.92818598	0.22400967	PARTIAL/NON SUPPORT
130	MRW61	CABIN CREEK	9/17/1996	44.12750000	-109.64388889	VOLCANIC MOUNTAINS & VALLEYS	11	9.94496194	1.10608769	FULL SUPPORT
1930	MRW61	CABIN CREEK	9/9/2009	44.12750000	-109.64388889	VOLCANIC MOUNTAINS & VALLEYS	11	9.93048999	1.10769962	FULL SUPPORT
1323	MRW0122	Cache Creek Lodgepole	8/28/2002	43.47049722	-110.74109444	SEDIMENTARY MOUNTAINS	11	9.28795695	1.18432935	FULL SUPPORT
84	MRW1	CACHE CREEK - LOWER - USGS STREAM GAGE	8/27/1993	43.45244722	-110.70362778	SEDIMENTARY MOUNTAINS	9	9.98540287	0.90131566	FULL SUPPORT
85	MRW1	CACHE CREEK - LOWER - USGS STREAM GAGE	9/1/1994	43.45244722	-110.70362778	SEDIMENTARY MOUNTAINS	10	9.97135758	1.00287247	FULL SUPPORT
86	MRW1	CACHE CREEK - LOWER - USGS STREAM GAGE	9/7/1995	43.45244722	-110.70362778	SEDIMENTARY MOUNTAINS	9	9.95065851	0.90446275	FULL SUPPORT
87	MRW1	CACHE CREEK - LOWER - USGS STREAM GAGE	9/4/1996	43.45244722	-110.70362778	SEDIMENTARY MOUNTAINS	11	9.99965656	1.10003778	FULL SUPPORT
320	MRW1	CACHE CREEK - LOWER - USGS STREAM GAGE	9/16/1997	43.45244722	-110.70362778	SEDIMENTARY MOUNTAINS	11	9.93036389	1.10771369	FULL SUPPORT
680	MRW1	CACHE CREEK - LOWER - USGS STREAM GAGE	10/6/1998	43.45244722	-110.70362778	SEDIMENTARY MOUNTAINS	12	9.92368111	1.20922870	FULL SUPPORT
841	MRW1	CACHE CREEK - LOWER - USGS STREAM GAGE	9/1/1999	43.45244722	-110.70362778	SEDIMENTARY MOUNTAINS	11	9.88433511	1.11287202	FULL SUPPORT
1184	MRW1	CACHE CREEK - LOWER - USGS STREAM GAGE	8/30/2000	43.45244722	-110.70362778	SEDIMENTARY MOUNTAINS	10	9.35962068	1.06841937	FULL SUPPORT
1185	MRW1	CACHE CREEK - LOWER - USGS STREAM GAGE	9/5/2001	43.45244722	-110.70362778	SEDIMENTARY MOUNTAINS	11	9.92410954	1.10841179	FULL SUPPORT
1320	MRW1	CACHE CREEK - LOWER - USGS STREAM GAGE	8/26/2002	43.45244722	-110.70362778	SEDIMENTARY MOUNTAINS	8	9.98398911	0.80128293	INDETERMINATE
1340	MRW1	CACHE CREEK - LOWER - USGS STREAM GAGE	9/3/2003	43.45244722	-110.70362778	SEDIMENTARY MOUNTAINS	9	9.95613688	0.90396507	FULL SUPPORT
1721	MRW1	CACHE CREEK - LOWER - USGS STREAM GAGE	8/28/2007	43.45244722	-110.70362778	SEDIMENTARY MOUNTAINS	12	9.95613688	1.20528676	FULL SUPPORT
90	MRW12	CACHE CREEK - UPPER	9/1/1994	43.45083333	-110.70083333	SEDIMENTARY MOUNTAINS	10	9.97464242	1.00254220	FULL SUPPORT
1550	MRC0112	Canyon Creek @Canyon Trailhead	6/16/2005	44.01256900	-107.30751900	BIGHORN BASIN FOOTHILLS	5	8.42697167	0.59333295	PARTIAL/NON SUPPORT
1751	WBO289	Canyon Creek Lower Golf Course	8/23/2007	44.01172500	-107.32575000	BIGHORN BASIN FOOTHILLS	6	7.79186140	0.77003423	INDETERMINATE
1749	WBO290	Canyon Creek Subdivision Upper	8/22/2007	44.01854000	-107.33228100	BIGHORN BASIN FOOTHILLS	6	8.38145440	0.71586621	INDETERMINATE
1260	WB180	CANYON CREEK - UW GRANT LAND	10/23/2002	42.41241667	-106.79127222	WYOMING BASIN	11	8.90230683	1.23563479	FULL SUPPORT
1357	WB180	CANYON CREEK - UW GRANT LAND	10/14/2003	42.41241667	-106.79127222	WYOMING BASIN	11	8.90230683	1.23563479	FULL SUPPORT
1753	WBO288	Canyon Creek Upper Golf Course	8/23/2007	44.01031600	-107.32416300	BIGHORN BASIN FOOTHILLS	6	7.74330366	0.77486306	INDETERMINATE
190	NGP7	CASPER CREEK	10/10/1995	42.91666667	-106.43027778	NE PLAINS	7	8.92820072	0.78403255	FULL SUPPORT
862	MRW92	Castle Creek (culvert)	9/14/1999	43.67677222	-109.37787222	VOLCANIC MOUNTAINS & VALLEYS	14	11.77713209	1.18874441	FULL SUPPORT
911	NGP82	Castle Creek above Salt Creek	7/27/1999	43.39738611	-106.27962778	NE PLAINS	2	8.92852934	0.22400106	PARTIAL/NON SUPPORT
1826	SRO057	CENTENNIAL CREEK - SHARP HILL	9/15/2008	41.27783935	-106.98545259	SOUTHERN FOOTHILLS & LARAMIE RANGE	13	14.29728068	0.90926382	FULL SUPPORT
315	MRW119	CHERRY CREEK - YOUNG BASIN	9/11/1997	42.62444444	-108.70916667	HIGH VALLEYS	9	8.05907316	1.11675373	FULL SUPPORT
266	WHP5	CHUGWATER CREEK	10/9/1996	42.04500000	-104.89611111	SE PLAINS	7	8.92855374	0.78400155	FULL SUPPORT
405	WHP17	CHUGWATER CREEK - FARTHING	10/22/1997	41.61000000	-105.13333333	SE PLAINS	8	8.92853089	0.89600407	FULL SUPPORT
1579	WHP17	CHUGWATER CREEK - FARTHING	10/24/2005	41.61083611	-105.13525556	SE PLAINS	10	8.92851603	1.12000695	FULL SUPPORT
1833	WHP17	CHUGWATER CREEK - FARTHING	10/20/2008	41.61083611	-105.13525556	SE PLAINS	10	8.92851879	1.12000660	FULL SUPPORT
820	WHP10	CHUGWATER CREEK - LOWER	10/22/1998	42.10578889	-104.86513611	SE PLAINS	3	8.92855932	0.33600046	PARTIAL/NON SUPPORT
819	WHP09	CHUGWATER CREEK - UPPER	10/23/1998	42.02167222	-104.92333333	SE PLAINS	8	8.92855709	0.89600144	FULL SUPPORT
1480	MRW0136	Clarks Fork (Station 6945)	8/17/2004	44.95821389	-109.81075000	GRANITIC MOUNTAINS	13	11.29627524	1.15082182	FULL SUPPORT
303	MRW29	CLARKS FORK RIVER - HUNTER PEAK	8/27/1997	44.88638889	-109.65555556	GRANITIC MOUNTAINS	9	11.31843018	0.79516327	INDETERMINATE
1502	MRW29	CLARKS FORK RIVER - HUNTER PEAK	8/17/2004	44.88638889	-109.65555556	GRANITIC MOUNTAINS	12	11.32590333	1.05951814	FULL SUPPORT
1494	WBO219	Clarks Fork River (Station 4169)	8/18/2004	44.88504722	-109.14015833	WYOMING BASIN	11	12.02308214	0.91490683	FULL SUPPORT
21	MRC25	CLEAR CREEK	9/24/1993	44.32327778	-106.82557500	SEDIMENTARY MOUNTAINS	14	15.50315510	0.90304199	FULL SUPPORT
829	MRC25	CLEAR CREEK	9/28/1999	44.32327778	-106.82557500	SEDIMENTARY MOUNTAINS	18	14.59658171	1.23316543	FULL SUPPORT
1000	MRC25	CLEAR CREEK	10/6/2000	44.32327778	-106.82557500	SEDIMENTARY MOUNTAINS	16	14.73642047	1.08574535	FULL SUPPORT
1553	MRC0110	Clear Creek @Gaging Station	8/9/2005	44.34350833	-106.70584722	HIGH VALLEYS	11	11.02457590	0.99777081	FULL SUPPORT
874	NGP45	Clear Creek - Above Buffalo WWTP	10/18/1999	44.36211111	-106.65299722	HIGH VALLEYS	10	11.53794732	0.86670529	FULL SUPPORT

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SAMPLEID	STATIONID	WATERBODY NAME	COLLECTION DATE	LAT(N)	LONG(W)	2011 BIOREGION	O	E	OE	NARRATIVE RATING
876	NGP47	Clear Creek - Above Clearmont WWTF	10/15/1999	44.63513056	-106.37624722	NE PLAINS	6	8.92522195	0.67225219	INDETERMINATE
877	NGP48	Clear Creek - Above Piney Creek	9/29/1999	44.56335000	-106.52516389	HIGH VALLEYS	9	10.71853428	0.83966704	INDETERMINATE
1554	MRC0113	Clear Creek Above Stream Modifications	8/9/2005	44.34108333	-106.71200833	HIGH VALLEYS	13	11.02800472	1.17881705	FULL SUPPORT
198	NGP118	CLEAR CREEK - BELOW BUFFALO	10/24/1995	44.40208611	-106.60941389	HIGH VALLEYS	10	10.82743855	0.92357947	FULL SUPPORT
913	NGP118	CLEAR CREEK - BELOW BUFFALO	9/30/1999	44.40208611	-106.60941389	HIGH VALLEYS	10	10.87898886	0.91920307	FULL SUPPORT
875	NGP46	Clear Creek - Below Buffalo WWTP	9/28/1999	44.36378611	-106.65109722	HIGH VALLEYS	9	10.98749382	0.81911309	INDETERMINATE
878	NGP49	Clear Creek - Below Clearmont WWTP	10/15/1999	44.64153889	-106.37142222	NE PLAINS	9	8.92528015	1.00837171	FULL SUPPORT
879	NGP50	Clear Creek - Below Piney Creek Confluence	9/29/1999	44.56547500	-106.52126389	NE PLAINS	9	8.92184930	1.00875947	FULL SUPPORT
1552	MRC0111	Clear Creek Below Stream Modifications	8/8/2005	44.34670000	-106.70087778	HIGH VALLEYS	13	11.02128383	1.17953591	FULL SUPPORT
46	MRC124	CLEAR CREEK - BUFFALO	10/1/1996	44.35190833	-106.69115833	HIGH VALLEYS	10	11.02275401	0.90721429	FULL SUPPORT
837	MRC124	CLEAR CREEK - BUFFALO	9/27/1999	44.35190833	-106.69115833	HIGH VALLEYS	11	11.05423110	0.99509409	FULL SUPPORT
832	MRC76	Clear Creek - City Park	9/22/1999	44.34523056	-106.70433889	HIGH VALLEYS	9	11.04929099	0.81453190	INDETERMINATE
880	NGP51	Clear Creek - County 70 Bridge	10/14/1999	44.75009167	-106.22308889	NE PLAINS	9	8.92724309	1.00814999	FULL SUPPORT
881	NGP52	Clear Creek - Foate	10/13/1999	44.85438889	-106.09777778	NE PLAINS	7	8.92786465	0.78406207	FULL SUPPORT
882	NGP53	Clear Creek - Leiter (14/16 Bridge)	10/14/1999	44.71565278	-106.28318889	NE PLAINS	10	8.92672272	1.12023195	FULL SUPPORT
883	NGP54	Clear Creek - Rowley's	10/13/1999	44.87215278	-106.08090556	NE PLAINS	7	8.92773505	0.78407345	FULL SUPPORT
884	NGP55	Clear Creek - Texaco	10/20/1999	44.52253056	-106.54833056	HIGH VALLEYS	9	10.88232515	0.82702914	INDETERMINATE
1506	NGP0179	Clear Creek (Station 4245)	9/17/2004	44.45379444	-106.35801667	HIGH VALLEYS	9	10.94581628	0.82223196	INDETERMINATE
1008	NGP104	Clear Creek Above Powder River	10/9/2000	44.87863056	-106.06967500	NE PLAINS	7	8.92755540	0.78408923	FULL SUPPORT
145	MRW76	CLEARWATER CREEK (ABOVE)	9/20/1996	44.46305556	-109.67083333	VOLCANIC MOUNTAINS & VALLEYS	12	11.15491397	1.07575908	FULL SUPPORT
278	MRW76	CLEARWATER CREEK (ABOVE)	9/10/1997	44.46305556	-109.67083333	VOLCANIC MOUNTAINS & VALLEYS	14	11.15176137	1.25540706	FULL SUPPORT
150	MRW111	CLEARWATER CREEK (BELOW)	9/20/1996	44.46416667	-109.67194444	VOLCANIC MOUNTAINS & VALLEYS	13	11.15218216	1.16569115	FULL SUPPORT
277	MRW111	CLEARWATER CREEK (BELOW)	9/10/1997	44.46416667	-109.67194444	VOLCANIC MOUNTAINS & VALLEYS	11	11.14902975	0.98663294	FULL SUPPORT
141	MRW72	CLOCKTOWER CREEK (ABOVE)	9/20/1996	44.46027778	-109.57500000	VOLCANIC MOUNTAINS & VALLEYS	9	12.67720762	0.70993552	INDETERMINATE
280	MRW72	CLOCKTOWER CREEK (ABOVE)	9/10/1997	44.46027778	-109.57500000	VOLCANIC MOUNTAINS & VALLEYS	8	12.69889434	0.62997611	PARTIAL/NON SUPPORT
184	MRW17	CLOCKTOWER CREEK (BELOW)	9/20/1996	44.46222222	-109.57388889	VOLCANIC MOUNTAINS & VALLEYS	10	12.66908944	0.78932271	INDETERMINATE
279	MRW17	CLOCKTOWER CREEK (BELOW)	9/10/1997	44.46222222	-109.57388889	VOLCANIC MOUNTAINS & VALLEYS	7	12.68348647	0.55189872	PARTIAL/NON SUPPORT
154	MRW115	COAL CREEK	9/25/1996	42.24055556	-110.85861111	HIGH VALLEYS	10	11.25520393	0.88847790	* FULL SUPPORT
177	MRW138	COAL CREEK	10/3/1995	42.39000000	-110.95194444	SEDIMENTARY MOUNTAINS	5	8.91198801	0.56104205	PARTIAL/NON SUPPORT
1529	MRW0138	Coal Creek Above Huff Creek	9/8/2004	42.38982500	-110.95134722	SEDIMENTARY MOUNTAINS	5	9.00435556	0.55528682	PARTIAL/NON SUPPORT
689	MRW80	COAL CREEK - LOWER	9/23/1998	42.23439444	-110.86624722	HIGH VALLEYS	11	11.04004379	0.99637286	FULL SUPPORT
1327	MRW80	COAL CREEK - LOWER	9/17/2002	42.23439444	-110.86624722	HIGH VALLEYS	11	11.06854089	0.99380759	FULL SUPPORT
688	MRW79	COAL CREEK - UPPER	9/22/1998	42.25938056	-110.84340000	SEDIMENTARY MOUNTAINS	5	9.61864153	0.51982393	PARTIAL/NON SUPPORT
1326	MRW79	COAL CREEK - UPPER	9/16/2002	42.25938056	-110.84340000	SEDIMENTARY MOUNTAINS	4	9.76339741	0.40969345	PARTIAL/NON SUPPORT
690	MRW81	COANTAG CREEK - BRIDGE (BEAR RIVER)	9/24/1998	42.37116111	-110.78874722	SEDIMENTARY MOUNTAINS	8	8.92125988	0.89673433	FULL SUPPORT
379	MRE11	COLD SPRINGS CREEK	10/2/1997	44.25277778	-104.17833333	BLACK HILLS	11	9.63892408	1.14120621	FULL SUPPORT
2	MRC10	COLUMBUS CREEK	10/25/1993	44.91138889	-107.39416667	HIGH VALLEYS	9	12.88207704	0.69864510	INDETERMINATE
1646	MRC10	COLUMBUS CREEK	10/5/2006	44.91138889	-107.39416667	HIGH VALLEYS	15	12.87688008	1.16487844	FULL SUPPORT
218	NGP18	COLUMBUS CREEK - LOWER	10/8/1996	44.89305556	-107.23611111	HIGH VALLEYS	7	9.60540355	0.72875647	INDETERMINATE
346	NGP18	COLUMBUS CREEK - LOWER	10/14/1997	44.89305556	-107.23611111	HIGH VALLEYS	6	9.55378987	0.62802302	PARTIAL/NON SUPPORT
66	MRC144	CONEY CREEK	9/16/1996	44.60951944	-107.30264444	GRANITIC MOUNTAINS	12	15.36979972	0.78075188	INDETERMINATE
323	MRC144	CONEY CREEK	9/17/1997	44.60951944	-107.30264444	GRANITIC MOUNTAINS	13	15.36979972	0.84581453	INDETERMINATE
677	MRC144	CONEY CREEK	9/14/1998	44.60951944	-107.30264444	GRANITIC MOUNTAINS	15	16.08363838	0.93262480	FULL SUPPORT
839	MRC144	CONEY CREEK	10/28/1999	44.60951944	-107.30264444	GRANITIC MOUNTAINS	2	16.08363838	0.12434997	PARTIAL/NON SUPPORT
1887	MRW0169	Corral Creek-Fitzpatrick	8/26/2009	42.68105799	-110.75451480	SEDIMENTARY MOUNTAINS	9	9.36135150	0.96139964	FULL SUPPORT
1196	WB105	Cottonwood Creek 2411 Crossing	8/22/2000	42.40022222	-107.69979722	WYOMING BASIN	10	8.98547027	1.11290781	FULL SUPPORT
778	WB40	COTTONWOOD CREEK - BAIRD (MIDDLE)	8/13/1998	43.85963611	-108.37281667	WYOMING BASIN	5	13.20339608	0.37869045	PARTIAL/NON SUPPORT
777	WB39	COTTONWOOD CREEK - LEGEND ROCK (UPPER)	8/12/1998	43.79353056	-108.60567500	WYOMING BASIN	6	12.95877534	0.46300671	PARTIAL/NON SUPPORT

Appendix C (cont.) – WY RIVPACS O/E values and narrative ratings for 1993-2009 samples. Asterisks designate samples that were outside model experience.

SAMPLEID	STATIONID	WATERBODY NAME	COLLECTION DATE	LAT(N)	LONG(W)	2011 BIOREGION	O	E	OE	NARRATIVE RATING
1230	WB39	COTTONWOOD CREEK - LEGEND ROCK (UPPER)	8/21/2001	43.79353056	-108.60567500	WYOMING BASIN	1	6.51776726	0.15342677	PARTIAL/NON SUPPORT
1267	WB39	COTTONWOOD CREEK - LEGEND ROCK (UPPER)	8/22/2002	43.79353056	-108.60567500	WYOMING BASIN	2	6.52237092	0.30663696	PARTIAL/NON SUPPORT
779	WB41	COTTONWOOD CREEK - LOWER	8/13/1998	43.86739722	-108.33338889	WYOMING BASIN	7	13.68594198	0.51147375	PARTIAL/NON SUPPORT
1212	WB151	Cottonwood Creek - Putney	8/21/2001	43.74880000	-108.81085000	WYOMING BASIN	6	13.04937015	0.45979231	PARTIAL/NON SUPPORT
1211	WB150	Cottonwood Creek - Rd 10 crossing	8/22/2001	43.82822500	-108.51067500	WYOMING BASIN	2	6.72881724	0.29722906	PARTIAL/NON SUPPORT
1693	WB256	COTTONWOOD CREEK - SEMINOE	9/19/2006	42.15992890	-106.92314677	SOUTHERN FOOTHILLS & LARAMIE RANGE	8	11.33117773	0.70601664	INDETERMINATE
1929	MRW0168	Crandall Creek	9/8/2009	44.85439300	-109.62012400	SEDIMENTARY MOUNTAINS	10	11.24093831	0.88960545	FULL SUPPORT
1858	NGP0213	Crazy Woman - Zexas Ranch	10/17/2008	44.06952025	-106.60876599	HIGH VALLEYS	10	10.85695637	0.92106845	FULL SUPPORT
191	NGP8	CRAZY WOMAN CREEK	10/26/1995	44.48611111	-106.13416667	NE PLAINS	9	8.92773418	1.00809453	FULL SUPPORT
885	NGP56	Crazy Woman Creek - State Section	10/25/1999	44.12973333	-106.48351111	NE PLAINS	9	8.92518185	1.00838282	FULL SUPPORT
886	NGP57	Crazy Woman Creek - Upper	10/26/1999	44.06397222	-106.59203056	NE PLAINS	11	8.92245113	1.23284508	FULL SUPPORT
1661	WB0264	Crooked Creek	10/17/2006	43.80245800	-107.33524800	BIGHORN BASIN FOOTHILLS	3	6.89307370	0.43521949	PARTIAL/NON SUPPORT
1533	MRW0140	Crooked Creek Hat Butte	10/11/2004	43.60887500	-109.81894722	HIGH VALLEYS	5	8.82332204	0.56667999	PARTIAL/NON SUPPORT
1795	MRW0140	Crooked Creek Hat Butte	10/8/2007	43.60887500	-109.81894722	HIGH VALLEYS	7	9.83369865	0.71183796	INDETERMINATE
1796	MRW0160	Crooked Creek Below North Fork	10/10/2007	43.61483056	-109.83081666	HIGH VALLEYS	5	9.40134251	0.53183894	PARTIAL/NON SUPPORT
1086	WB131	Crooked Creek above Crooked Creek Bay	8/21/2001	44.96343611	-108.27924444	WYOMING BASIN	4	7.11655888	0.56206940	PARTIAL/NON SUPPORT
1085	WB132	Crooked Creek below Montana state line	8/21/2001	44.98425833	-108.34983333	WYOMING BASIN	3	7.91072655	0.37923192	PARTIAL/NON SUPPORT
400	WBI22	CROOKS CREEK - LOWER	10/7/1997	42.40722222	-107.85444444	WYOMING BASIN	6	6.84265047	0.87685321	FULL SUPPORT
340	WBI23	CROOKS CREEK - UPPER	10/8/1997	42.40055556	-107.85638889	WYOMING BASIN	7	6.96046920	1.00567933	FULL SUPPORT
96	MRW18	CROW CREEK	9/2/1993	44.51313889	-109.97328056	VOLCANIC MOUNTAINS & VALLEYS	11	11.79168381	0.93286083	FULL SUPPORT
97	MRW18	CROW CREEK	9/7/1994	44.51313889	-109.97328056	VOLCANIC MOUNTAINS & VALLEYS	13	11.77158084	1.10435465	FULL SUPPORT
98	MRW18	CROW CREEK	9/22/1995	44.51313889	-109.97328056	VOLCANIC MOUNTAINS & VALLEYS	11	11.75231719	0.93598563	FULL SUPPORT
99	MRW18	CROW CREEK	9/18/1996	44.51313889	-109.97328056	VOLCANIC MOUNTAINS & VALLEYS	14	11.75231719	1.19125444	FULL SUPPORT
301	MRW18	CROW CREEK	8/26/1997	44.51313889	-109.97328056	VOLCANIC MOUNTAINS & VALLEYS	15	11.73401569	1.27833475	FULL SUPPORT
682	MRW18	CROW CREEK	9/4/1998	44.51313889	-109.97328056	VOLCANIC MOUNTAINS & VALLEYS	13	11.73401569	1.10789012	FULL SUPPORT
856	MRW18	CROW CREEK	8/31/1999	44.51313889	-109.97328056	VOLCANIC MOUNTAINS & VALLEYS	12	11.20369758	1.07107497	FULL SUPPORT
1003	MRW18	CROW CREEK	9/6/2000	44.51313889	-109.97328056	VOLCANIC MOUNTAINS & VALLEYS	13	11.77081235	1.10442675	FULL SUPPORT
1111	MRW18	CROW CREEK	8/27/2001	44.51313889	-109.97328056	VOLCANIC MOUNTAINS & VALLEYS	12	11.23029755	1.06853803	FULL SUPPORT
1284	MRW18	CROW CREEK	8/28/2002	44.51313889	-109.97328056	VOLCANIC MOUNTAINS & VALLEYS	9	11.80808516	0.76218962	INDETERMINATE
1361	MRW18	CROW CREEK	8/12/2003	44.51313889	-109.97328056	VOLCANIC MOUNTAINS & VALLEYS	12	11.76765408	1.01974446	FULL SUPPORT
1757	MRW18	CROW CREEK	9/5/2007	44.51313889	-109.97328056	VOLCANIC MOUNTAINS & VALLEYS	12	11.74857904	1.02140012	FULL SUPPORT
1839	MRW18	CROW CREEK	8/28/2008	44.51313889	-109.97328056	VOLCANIC MOUNTAINS & VALLEYS	13	11.73805363	1.10750900	FULL SUPPORT
268	WHP11	CROW CREEK - ARCOLA	11/4/1993	41.10361111	-104.45416667	SE PLAINS	9	8.92856606	1.00800061	FULL SUPPORT
269	WHP11	CROW CREEK - ARCOLA	8/3/1994	41.10361111	-104.45416667	SE PLAINS	4	8.92856606	0.44800027	PARTIAL/NON SUPPORT
967	WHP11	CROW CREEK - ARCOLA	10/26/1999	41.10328056	-104.45371667	SE PLAINS	8	8.92856607	0.89600054	FULL SUPPORT
1745	WHP0051	CROW CREEK - DEMING DRIVE	10/4/2007	41.12349220	-104.81208440	SE PLAINS	5	8.92855823	0.56000083	INDETERMINATE
1803	WHP0051	CROW CREEK - DEMING DRIVE	10/10/2008	41.12349220	-104.81208440	SE PLAINS	6	8.92855353	0.67200135	INDETERMINATE
824	WHP11	CROW CREEK - DOWNSTREAM OF DRY CREEK	9/28/1998	41.12920000	-104.70496667	SE PLAINS	2	8.92856272	0.22400022	PARTIAL/NON SUPPORT
972	WHP11	CROW CREEK - DOWNSTREAM OF DRY CREEK	10/27/1999	41.12920000	-104.70496667	SE PLAINS	3	8.92855953	0.33600045	PARTIAL/NON SUPPORT
1805	WHP11	CROW CREEK - DOWNSTREAM OF DRY CREEK	10/14/2008	41.12920000	-104.70496667	SE PLAINS	3	8.92855079	0.33600078	PARTIAL/NON SUPPORT
968	WHP28	CROW CREEK - FAMCAMP	10/29/1999	41.15613056	-104.87467500	SE PLAINS	7	8.92854862	0.78400200	FULL SUPPORT
823	WHP13	CROW CREEK - HAPPY JACK ROAD	9/28/1998	41.13576944	-104.84286111	SE PLAINS	10	8.92855619	1.12000191	FULL SUPPORT
1781	WHP13	CROW CREEK - HAPPY JACK ROAD	10/3/2007	41.13576944	-104.84286111	SE PLAINS	5	8.92855664	0.56000093	INDETERMINATE
1799	WHP13	CROW CREEK - HAPPY JACK ROAD	10/7/2008	41.13576944	-104.84286111	SE PLAINS	5	8.92855664	0.56000093	INDETERMINATE
1746	WHP0047	CROW CREEK - HAYSTACK	10/8/2007	41.12497200	-104.78129860	SE PLAINS	1	8.92855730	0.11200018	PARTIAL/NON SUPPORT
1804	WHP0047	CROW CREEK - HAYSTACK	10/9/2008	41.12497200	-104.78129860	SE PLAINS	4	8.92855514	0.44800082	PARTIAL/NON SUPPORT
822	WHP12	CROW CREEK - MORRIE AVENUE	9/28/1998	41.12262500	-104.79537778	SE PLAINS	7	8.92856051	0.78400096	FULL SUPPORT
1782	WHP12	CROW CREEK - MORRIE AVENUE	10/5/2007	41.12262500	-104.79537778	SE PLAINS	6	8.92855814	0.67200100	INDETERMINATE

Assessment of Aquatic Biological Condition Using WY RIVPACS with Comparisons to the Wyoming Stream Integrity Index (WSII)

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SAMPLEID	STATIONID	WATERBODY NAME	COLLECTION DATE	LAT(N)	LONG(W)	2011 BIOREGION	O	E	OE	NARRATIVE RATING
1801	WHP12	CROW CREEK - MORRIE AVENUE	10/8/2008	41.12262500	-104.79537778	SE PLAINS	4	8.92855370	0.44800089	PARTIAL/NON SUPPORT
1747	WHP0046	CROW CREEK - SOUTH COLLEGE DRIVE	10/9/2007	41.12149970	-104.76557950	SE PLAINS	3	8.92855936	0.33600045	PARTIAL/NON SUPPORT
1802	WHP0046	CROW CREEK - SOUTH COLLEGE DRIVE	10/10/2008	41.12149970	-104.76557950	SE PLAINS	4	8.92855888	0.44800063	PARTIAL/NON SUPPORT
270	WHP12	CROW CREEK - STATION 2	8/4/1994	41.12638889	-104.65861111	SE PLAINS	4	8.92856191	0.44800048	PARTIAL/NON SUPPORT
271	WHP14	CROW CREEK - STATION 4	11/4/1993	41.12222222	-104.79694444	SE PLAINS	4	8.92856054	0.44800055	PARTIAL/NON SUPPORT
272	WHP14	CROW CREEK - STATION 4	8/4/1994	41.12222222	-104.79694444	SE PLAINS	5	8.92856054	0.56000068	INDETERMINATE
273	WHP14B	CROW CREEK - STATION 4B	8/4/1994	41.12666667	-104.82361111	SE PLAINS	4	8.92856054	0.44800055	PARTIAL/NON SUPPORT
274	WHP15	CROW CREEK - STATION 5	11/4/1993	41.13194444	-104.82916667	SE PLAINS	6	8.92855770	0.67200103	INDETERMINATE
275	WHP15	CROW CREEK - STATION 5	8/4/1994	41.13194444	-104.82916667	SE PLAINS	5	8.92855675	0.56000092	INDETERMINATE
276	WHP16	CROW CREEK - STATION 6	8/5/1994	41.14916667	-104.86333333	SE PLAINS	9	8.92855518	1.00800183	FULL SUPPORT
821	WHP11	CROW CREEK - UPSTREAM OF DRY CREEK	9/29/1998	41.12723889	-104.70533056	SE PLAINS	6	8.92856384	0.67200057	INDETERMINATE
953	WHP11	CROW CREEK - UPSTREAM OF DRY CREEK	10/27/1999	41.12723889	-104.70533056	SE PLAINS	6	8.92855845	0.67200098	INDETERMINATE
1731	WHP11	CROW CREEK - UPSTREAM OF DRY CREEK	10/10/2007	41.12723889	-104.70533056	SE PLAINS	4	8.92856228	0.44800046	PARTIAL/NON SUPPORT
1800	WHP11	CROW CREEK - UPSTREAM OF DRY CREEK	10/13/2008	41.12723889	-104.70533056	SE PLAINS	4	8.92856215	0.44800047	PARTIAL/NON SUPPORT
88	MRW10	CRYSTAL CREEK	9/5/1996	43.55833333	-110.40555556	SEDIMENTARY MOUNTAINS	12	9.55585789	1.25577422	FULL SUPPORT
1722	MRW10	CRYSTAL CREEK	8/29/2007	43.55833333	-110.40555556	SEDIMENTARY MOUNTAINS	10	9.55004473	1.04711551	FULL SUPPORT
1528	MRW0144	Crystal Creek Shorty	8/31/2004	43.57800000	-110.41100000	SEDIMENTARY MOUNTAINS	12	9.54974589	1.25657794	FULL SUPPORT
1198	WB107	Currant Creek Gorge	9/12/2000	41.25753333	-109.53788889	WYOMING BASIN	8	11.10818782	0.72018948	INDETERMINATE
1875	WB0313	Currant Creek Above WB107	9/8/2008	41.25696660	-109.53333300	WYOMING BASIN	6	9.97825330	0.60130765	PARTIAL/NON SUPPORT
1197	WB106	Currant Creek Big Ridge	9/12/2000	41.21568889	-109.38010833	WYOMING BASIN	9	12.13510555	0.74164991	INDETERMINATE
1876	WB106	Currant Creek Big Ridge	9/9/2008	41.21568889	-109.38010833	WYOMING BASIN	9	12.74618717	0.70609351	INDETERMINATE
1083	MRW117	Dead Indian Creek below Dead Indian Campground	8/29/2001	44.75566944	-109.41617500	SEDIMENTARY MOUNTAINS	9	9.54588652	0.94281448	FULL SUPPORT
225	SR17	DEEP CREEK	8/22/1996	41.19083333	-107.22444444	SOUTHERN FOOTHILLS & LARAMIE RANGE	11	11.63032888	0.94580300	FULL SUPPORT
866	MRW96	Deep Creek Canyon Mouth	8/17/1999	42.63156111	-108.63651944	HIGH VALLEYS	6	8.01389407	0.74869969	INDETERMINATE
1338	MRW96	Deep Creek Canyon Mouth	8/19/2003	42.63156111	-108.63651944	HIGH VALLEYS	7	7.99732240	0.87529296	FULL SUPPORT
1877	WB0329	Deep Creek-Strawberry Confluence	6/22/2009	42.43664123	-108.51512870	HIGH VALLEYS	5	8.37755577	0.59683279	PARTIAL/NON SUPPORT
129	MRW60	DEER CREEK	9/17/1996	44.16055556	-109.62083333	VOLCANIC MOUNTAINS & VALLEYS	14	11.08763697	1.26266760	FULL SUPPORT
1931	MRW60	DEER CREEK	9/10/2009	44.16055556	-109.62083333	VOLCANIC MOUNTAINS & VALLEYS	11	10.53614973	1.04402465	FULL SUPPORT
229	SR22	DEER CREEK - LOWER	10/16/1996	42.72250000	-106.02555556	SOUTHERN FOOTHILLS & LARAMIE RANGE	12	11.15519238	1.07573223	FULL SUPPORT
1694	SR22	DEER CREEK - LOWER	10/4/2006	42.72255365	-106.02752651	SOUTHERN FOOTHILLS & LARAMIE RANGE	8	10.93907515	0.73132325	INDETERMINATE
389	SR18	DEER CREEK - MIDDLE	10/7/1997	42.57444444	-106.03666667	SOUTHERN FOOTHILLS & LARAMIE RANGE	12	9.82639503	1.22120065	FULL SUPPORT
388	SR13	DEER CREEK - UPPER	10/6/1997	42.49916667	-106.07972222	SOUTHERN FOOTHILLS & LARAMIE RANGE	7	8.38612266	0.83471233	INDETERMINATE
401	WB14	DEWEESE CREEK	10/1/1997	42.30210833	-106.96081389	WYOMING BASIN	6	8.56270910	0.70071282	INDETERMINATE
818	WB14A	DEWEESE CREEK	10/8/1998	42.30210833	-106.96081389	WYOMING BASIN	7	8.59610761	0.81432205	INDETERMINATE
952	WB14A	DEWEESE CREEK	9/14/1999	42.30210833	-106.96081389	WYOMING BASIN	7	8.65089398	0.80916493	INDETERMINATE
1029	WB14A	DEWEESE CREEK	10/3/2000	42.30210833	-106.96081389	WYOMING BASIN	7	7.71563211	0.90724906	FULL SUPPORT
1112	WB14A	DEWEESE CREEK	9/12/2001	42.30210833	-106.96081389	WYOMING BASIN	8	8.56384285	0.93416007	FULL SUPPORT
1312	WB14A	DEWEESE CREEK	9/23/2002	42.30210833	-106.96081389	WYOMING BASIN	8	8.52836252	0.93804643	FULL SUPPORT
1354	WB14A	DEWEESE CREEK	9/24/2003	42.30210833	-106.96081389	WYOMING BASIN	5	8.52836252	0.58627902	PARTIAL/NON SUPPORT
1686	WB14A	DEWEESE CREEK	9/18/2006	42.30210833	-106.96081389	WYOMING BASIN	7	8.48450731	0.82503317	FULL SUPPORT
221	SR10	DIRTYMAN FORK	8/27/1996	41.25916667	-107.23250000	WYOMING BASIN	9	6.29281834	1.43020178	FULL SUPPORT
974	NGP109	Donkey Creek - State Section	8/29/2000	44.29696944	-105.29126667	NE PLAINS	5	8.92842907	0.56000893	INDETERMINATE
978	NGP110	Donkey Creek Above Adon Rd.	8/29/2000	44.28454444	-105.20597778	NE PLAINS	4	8.92848327	0.44800442	PARTIAL/NON SUPPORT
980	NGP112	Donkey Creek Above Stonepile Creek	8/29/2000	44.26267222	-105.46353600	NE PLAINS	1	8.92823939	0.11200417	PARTIAL/NON SUPPORT
979	NGP115	Donkey Creek Above Wyodak	8/30/2000	44.26716667	-105.41666667	NE PLAINS	4	8.92817854	0.44801971	PARTIAL/NON SUPPORT
975	NGP114	Donkey Creek at Belle Fourche Confluence	8/31/2000	44.28573900	-104.97420300	NE PLAINS	8	8.92855826	0.89600132	FULL SUPPORT
976	NGP113	Donkey Creek Below Well Creek	8/31/2000	44.28301944	-105.06367778	NE PLAINS	5	8.92852605	0.56000285	INDETERMINATE
977	NGP111	Donkey Creek Below Wyodak	8/30/2000	44.23960000	-105.37391400	NE PLAINS	2	8.92827902	0.22400734	PARTIAL/NON SUPPORT

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SAMPLEID	STATIONID	WATERBODY NAME	COLLECTION DATE	LAT(N)	LONG(W)	2011 BIOREGION	O	E	OE	NARRATIVE RATING
356	SRI13	DOUGLAS CREEK - DREDGE	10/16/1997	41.12750000	-106.24611111	SOUTHERN ROCKIES	15	18.69691165	0.80227153	INDETERMINATE
393	SRI12	DOUGLAS CREEK - JIM CREEK	10/15/1997	41.16111111	-106.25500000	SOUTHERN ROCKIES	12	18.72643938	0.64080521	INDETERMINATE
358	SRI14	DOUGLAS CREEK - PELTON	10/16/1997	41.07583333	-106.30222222	SOUTHERN FOOTHILLS & LARAMIE RANGE	18	15.69027720	1.14720727	FULL SUPPORT
1743	SRI14	DOUGLAS CREEK - PELTON	9/25/2007	41.07559515	-106.30291443	SOUTHERN FOOTHILLS & LARAMIE RANGE	14	15.86542986	0.88242173	FULL SUPPORT
353	SRI11	DOUGLAS CREEK - WILDERNESS	10/15/1997	41.13055556	-106.42527778	SOUTHERN FOOTHILLS & LARAMIE RANGE	10	11.60641547	0.86159246	INDETERMINATE
1780	SRI11	DOUGLAS CREEK - WILDERNESS	9/26/2007	41.13131570	-106.42564770	SOUTHERN FOOTHILLS & LARAMIE RANGE	14	11.58666786	1.20828526	FULL SUPPORT
634	MRC50	Doyle Creek - Lower	9/18/1998	44.07118056	-106.98251111	GRANITIC MOUNTAINS	16	15.49305245	1.03272096	FULL SUPPORT
635	MRC51	Doyle Creek - Upper	9/18/1998	44.04860000	-107.02375833	GRANITIC MOUNTAINS	16	16.90099234	0.94668997	FULL SUPPORT
1098	WB144	Dry Creek	10/2/2001	44.50632222	-108.05736667	WYOMING BASIN	4	7.74369190	0.51654948	PARTIAL/NON SUPPORT
1564	WB144	Dry Creek	9/19/2005	44.50632222	-108.05736667	WYOMING BASIN	7	6.92538543	1.01077407	FULL SUPPORT
1567	WB0251	Dry Creek	9/20/2005	44.46470000	-108.60670000	WYOMING BASIN	1	6.40231182	0.15619358	PARTIAL/NON SUPPORT
1766	WB0230	Dry Creek Emblem	10/9/2007	44.49900000	-108.44200000	WYOMING BASIN	4	5.20910964	0.76788555	INDETERMINATE
1099	WB145	Dry Creek below Emblem Bench	10/2/2001	44.50212778	-108.23568333	WYOMING BASIN	6	6.02313983	0.99615818	FULL SUPPORT
1566	WB145	Dry Creek below Emblem Bench	9/20/2005	44.50212778	-108.23568333	WYOMING BASIN	7	6.08981337	1.14946051	FULL SUPPORT
308	WB19	DRY MEDICINE LODGE CREEK	9/4/1997	44.30111111	-107.54055556	BIGHORN BASIN FOOTHILLS	3	5.98272832	0.50144346	PARTIAL/NON SUPPORT
1571	WB19	DRY MEDICINE LODGE CREEK	8/22/2005	44.30111111	-107.54055556	BIGHORN BASIN FOOTHILLS	3	6.75067132	0.44440025	PARTIAL/NON SUPPORT
1450	WB0235	Dry Piney Creek Below Fogarty	6/2/2004	42.38741111	-110.26611111	WYOMING BASIN	2	9.68975159	0.20640364	PARTIAL/NON SUPPORT
791	WB53	DRY PINEY CREEK - LOWER (GREEN RIVER)	10/2/1998	42.40741389	-110.18052500	WYOMING BASIN	7	10.79601564	0.64838735	INDETERMINATE
790	WB52	DRY PINEY CREEK - UPPER/Tank Battery (GREEN RIVER)	10/1/1998	42.37699722	-110.28743333	WYOMING BASIN	6	9.16159472	0.65490782	INDETERMINATE
1516	WB52	DRY PINEY CREEK - UPPER/Tank Battery (GREEN RIVER)	6/1/2004	42.37699722	-110.28743333	WYOMING BASIN	2	8.68609430	0.23025308	PARTIAL/NON SUPPORT
1768	WB0292	Eaglenest Creek - Kamms Corner	10/24/2007	44.70111400	-108.98008600	WYOMING BASIN	3	9.17619171	0.32693301	PARTIAL/NON SUPPORT
1859	WB0292	Eaglenest Creek - Kamms Corner	10/23/2008	44.70111400	-108.98008600	WYOMING BASIN	1	9.16928167	0.10905980	PARTIAL/NON SUPPORT
1601	MRW0145	East Du Noir Creek Coffin Butte	8/16/2005	43.75136389	-109.81713333	VOLCANIC MOUNTAINS & VALLEYS	9	7.74913305	0.92315901	FULL SUPPORT
299	SR26	EAST FORK SAVERY CREEK - CARRICO	8/14/1997	41.26972222	-107.19916667	WYOMING BASIN	10	7.79898858	1.28221755	FULL SUPPORT
1684	SR26	EAST FORK SAVERY CREEK - CARRICO	8/16/2006	41.26972222	-107.19916667	WYOMING BASIN	11	7.77919230	1.41402855	FULL SUPPORT
1346	WU0001	East Fork Smiths Fork Gaging Station	10/14/2003	41.05228611	-110.39807778	SOUTHERN ROCKIES	17	18.63540594	0.91224200	* FULL SUPPORT
1534	MRW0141	East Fork Wind River Wilderness Boundary	10/13/2004	43.70278333	-109.35803889	VOLCANIC MOUNTAINS & VALLEYS	8	9.07695284	0.88135304	FULL SUPPORT
843	MRW101	East Fork Wind River Alkali Confluence	9/16/1999	43.63082500	-109.38665833	HIGH VALLEYS	7	10.03306903	0.69769280	INDETERMINATE
868	MRW99	East Fork Wind River Upper/Below Lean-to Creek	9/14/1999	43.69077222	-109.36136111	VOLCANIC MOUNTAINS & VALLEYS	10	9.55380859	1.04670299	FULL SUPPORT
842	MRW100	East Fork Wind River Bluff	9/16/1999	43.59073333	-109.44307778	HIGH VALLEYS	11	11.23673684	0.97893189	FULL SUPPORT
923	WB100	East Fork Wind River Lower (State) Above Harvey Dr	9/15/1999	43.54801944	-109.45789722	HIGH VALLEYS	12	11.25958896	1.06575827	FULL SUPPORT
27	MRC27	EAST PASS CREEK	10/20/1993	44.94972222	-107.48000000	HIGH VALLEYS	11	12.49409300	0.88041605	FULL SUPPORT
142	MRW73	ELK FORK CREEK (ABOVE)	9/20/1996	44.46472222	-109.62777778	VOLCANIC MOUNTAINS & VALLEYS	14	10.16503046	1.37727084	FULL SUPPORT
282	MRW73	ELK FORK CREEK (ABOVE)	9/10/1997	44.46472222	-109.62777778	VOLCANIC MOUNTAINS & VALLEYS	13	10.16775922	1.27855113	FULL SUPPORT
185	MRW18	ELK FORK CREEK (BELOW)	9/20/1996	44.46611111	-109.62722222	VOLCANIC MOUNTAINS & VALLEYS	11	10.16517529	1.08212595	FULL SUPPORT
281	MRW18	ELK FORK CREEK (BELOW)	9/10/1997	44.46611111	-109.62722222	VOLCANIC MOUNTAINS & VALLEYS	14	10.16790231	1.37688184	FULL SUPPORT
106	MRW31	ELK FORK RIVER	9/7/1994	44.45777778	-109.63250000	VOLCANIC MOUNTAINS & VALLEYS	10	10.16730018	0.98354527	FULL SUPPORT
1037	WB127	Encampment River - Above USGS Station 06625000	9/13/2000	41.30320556	-106.71458611	WYOMING BASIN	13	12.60071276	1.03168767	FULL SUPPORT
230	SR23	ENCAMPMENT RIVER - IOOF	8/29/1996	41.18277778	-106.79388889	SOUTHERN FOOTHILLS & LARAMIE RANGE	16	15.79726339	1.01283365	FULL SUPPORT
1727	SR23	ENCAMPMENT RIVER - IOOF	8/28/2007	41.18301400	-106.79440600	SOUTHERN FOOTHILLS & LARAMIE RANGE	16	16.60365690	0.96364314	FULL SUPPORT
220	SR1	ENCAMPMENT RIVER - STATELINE	9/4/1996	41.00472222	-106.81472222	SOUTHERN ROCKIES	23	18.65775594	1.23273131	FULL SUPPORT
238	SR9	ENCAMPMENT RIVER - WATER VALLEY	8/28/1996	41.12638889	-106.78722222	SOUTHERN ROCKIES	14	17.06532150	0.82037716	INDETERMINATE
223	SR15	ENCAMPMENT RIVER - WILDERNESS	9/5/1996	41.00703056	-106.81600000	SOUTHERN ROCKIES	21	18.68736493	1.12375394	FULL SUPPORT
309	SR15	ENCAMPMENT RIVER - WILDERNESS	9/9/1997	41.00703056	-106.81600000	SOUTHERN ROCKIES	17	18.62108620	0.91294352	FULL SUPPORT
761	SR15	ENCAMPMENT RIVER - WILDERNESS	9/17/1998	41.00703056	-106.81600000	SOUTHERN ROCKIES	18	18.68736493	0.96321766	FULL SUPPORT
920	SR15	ENCAMPMENT RIVER - WILDERNESS	9/24/1999	41.00703056	-106.81600000	SOUTHERN ROCKIES	20	18.65708029	1.07197909	FULL SUPPORT
1027	SR15	ENCAMPMENT RIVER - WILDERNESS	9/14/2000	41.00703056	-106.81600000	SOUTHERN ROCKIES	18	18.64726419	0.96528905	FULL SUPPORT
1113	SR15	ENCAMPMENT RIVER - WILDERNESS	9/6/2001	41.00703056	-106.81600000	SOUTHERN ROCKIES	20	18.70622121	1.06916302	FULL SUPPORT

Assessment of Aquatic Biological Condition Using WY RIVPACS with Comparisons to the Wyoming Stream Integrity Index (WSII)

Appendix C (cont.) – WY RIVPACS O/E values and narrative ratings for 1993-2009 samples. Asterisks designate samples that were outside model experience.

SAMPLEID	STATIONID	WATERBODY NAME	COLLECTION DATE	LAT(N)	LONG(W)	2011 BIOREGION	O	E	OE	NARRATIVE RATING
1273	SR15	ENCAMPMENT RIVER - WILDERNESS	9/13/2002	41.00703056	-106.81600000	SOUTHERN ROCKIES	15	18.74496656	0.80021482	INDETERMINATE
1457	MRW0143	Fall Creek Above Snake Confluence	8/30/2004	43.31566944	-110.73685278	SEDIMENTARY MOUNTAINS	5	9.52971485	0.52467467	PARTIAL/NON SUPPORT
113	MRW42	FALLS RIVER	8/31/1993	44.13472222	-110.82083333	VOLCANIC MOUNTAINS & VALLEYS	7	9.80021218	0.71427025	INDETERMINATE
1045	MRE17	Fawn Creek - Above F.S. Boundary	10/17/2000	44.63750833	-104.37569167	BLACK HILLS	5	9.05458071	0.55220669	PARTIAL/NON SUPPORT
172	MRW133	FISH CREEK - STATION 1	9/7/1995	43.49277778	-110.87277778	VOLCANIC MOUNTAINS & VALLEYS	7	10.05187924	0.69638720	INDETERMINATE
173	MRW134	FISH CREEK - STATION 2	9/6/1995	43.52194444	-110.86333333	VOLCANIC MOUNTAINS & VALLEYS	4	9.55422001	0.41866317	PARTIAL/NON SUPPORT
174	MRW135	FISH CREEK - STATION 3	9/6/1995	43.54555556	-110.84583333	VOLCANIC MOUNTAINS & VALLEYS	3	11.14159770	0.26926120	PARTIAL/NON SUPPORT
175	MRW136	FISH CREEK - STATION 4	9/6/1995	43.58527778	-110.82555556	VOLCANIC MOUNTAINS & VALLEYS	3	14.55629926	0.20609634	PARTIAL/NON SUPPORT
219	NGP19	FIVE MILE CREEK	10/8/1996	44.90638889	-107.16888889	NE PLAINS	9	8.79193881	1.02366500	FULL SUPPORT
343	NGP19	FIVE MILE CREEK	10/10/1997	44.90638889	-107.16888889	NE PLAINS	7	8.76355806	0.79876232	FULL SUPPORT
1218	WB157	Five Mile Creek - Lost Wells Butte	8/30/2001	43.19407222	-108.36849722	WYOMING BASIN	4	5.77700921	0.69239980	INDETERMINATE
1219	WB158	Fivemile Creek - S7T3R3	8/28/2001	43.24710278	-108.56292778	WYOMING BASIN	5	7.02847502	0.71139187	INDETERMINATE
1220	WB159	Fivemile Creek - Wyoming Canal Crossing	8/28/2001	43.29892222	-108.69787222	WYOMING BASIN	2	8.56791613	0.23342899	PARTIAL/NON SUPPORT
1217	WB156	Fivemile Creek - Boysen	8/31/2001	43.20844444	-108.23720000	WYOMING BASIN	5	5.90221864	0.84713907	FULL SUPPORT
1791	MRW0158	Flat Creek Saddle Butte	8/27/2007	43.48362500	-110.76535000	VOLCANIC MOUNTAINS & VALLEYS	8	10.02495036	0.79800894	INDETERMINATE
1613	MRW0147	Fontenelle Creek Clear	9/21/2005	42.16920000	-110.53413889	SEDIMENTARY MOUNTAINS	12	13.99598519	0.85738873	FULL SUPPORT
1612	WBO242	Fontenelle Creek USGS Gage	9/20/2005	42.09585278	-110.41650556	WYOMING BASIN	10	10.90700262	0.91684217	FULL SUPPORT
249	WB23	FONTENELLE CREEK - LOWER	9/27/1996	42.09743056	-110.19126667	WYOMING BASIN	7	11.81032536	0.59270171	PARTIAL/NON SUPPORT
396	WB23	FONTENELLE CREEK - LOWER	10/14/1997	42.09743056	-110.19126667	WYOMING BASIN	6	11.89722644	0.50431922	PARTIAL/NON SUPPORT
765	WB23	FONTENELLE CREEK - LOWER	9/1/1998	42.09743056	-110.19126667	WYOMING BASIN	10	10.63969284	0.93987676	FULL SUPPORT
927	WB23	FONTENELLE CREEK - LOWER	10/7/1999	42.09743056	-110.19126667	WYOMING BASIN	12	11.80002512	1.01694699	FULL SUPPORT
1051	WB23	FONTENELLE CREEK - LOWER	9/27/2000	42.09743056	-110.19126667	WYOMING BASIN	6	10.55707218	0.56833939	PARTIAL/NON SUPPORT
1226	WB23	FONTENELLE CREEK - LOWER	9/24/2001	42.09743056	-110.19126667	WYOMING BASIN	9	11.70033124	0.76920899	INDETERMINATE
1329	WB23	FONTENELLE CREEK - LOWER	9/24/2002	42.09743056	-110.19126667	WYOMING BASIN	7	11.85504176	0.59046608	PARTIAL/NON SUPPORT
1343	WB23	FONTENELLE CREEK - LOWER	9/30/2003	42.09743056	-110.19126667	WYOMING BASIN	7	11.75194509	0.59564608	PARTIAL/NON SUPPORT
1611	WB23	FONTENELLE CREEK - LOWER	9/19/2005	42.09743056	-110.19126667	WYOMING BASIN	8	11.80519224	0.67766791	INDETERMINATE
127	MRW59	FONTENELLE CREEK - UPPER	9/26/1996	42.28777778	-110.57472222	SEDIMENTARY MOUNTAINS	10	8.92405505	1.12056682	FULL SUPPORT
695	MRW86	FONTENELLE CREEK - UPPER (GREEN RIVER)	9/1/1998	42.24008333	-110.55520556	SEDIMENTARY MOUNTAINS	9	8.88743573	1.01266555	FULL SUPPORT
1610	MRW86	FONTENELLE CREEK - UPPER (GREEN RIVER)	9/14/2005	42.24008333	-110.55520556	SEDIMENTARY MOUNTAINS	7	8.89370334	0.78707370	INDETERMINATE
636	MRC52	French Creek - Above Paradise Guest Ranch	9/22/1998	44.34611667	-106.96205278	GRANITIC MOUNTAINS	15	13.90470373	1.07877164	FULL SUPPORT
707	NGP20	French Creek - Buffalo	9/28/1998	44.35528056	-106.68565833	HIGH VALLEYS	10	9.34698724	1.06986345	FULL SUPPORT
637	MRC53	French Creek - Goddard Ranch	9/28/1998	44.37102778	-106.74716667	HIGH VALLEYS	14	12.66921024	1.10504126	FULL SUPPORT
638	MRC54	French Creek - Sanders	9/28/1998	44.36444167	-106.81364722	SOUTHERN ROCKIES	16	14.38012635	1.11264669	FULL SUPPORT
245	SRI7	GARDEN CREEK - 13TH STREET	10/15/1996	42.83722222	-106.35916667	NE PLAINS	5	8.89098251	0.56236754	INDETERMINATE
244	SRI6	GARDEN CREEK - WYOMING BOULEVARD	10/15/1996	42.80444444	-106.34722222	NE PLAINS	7	8.80867452	0.79467121	FULL SUPPORT
692	MRW83	GIRAFFE CREEK - BAUMAN	10/8/1998	42.40370833	-110.99915833	SEDIMENTARY MOUNTAINS	8	8.89432776	0.89944965	FULL SUPPORT
199	NGP119	GOOSE CREEK	10/26/1994	44.82686944	-106.96301389	HIGH VALLEYS	8	11.27557734	0.70949804	INDETERMINATE
735	NGP119	GOOSE CREEK	10/30/1998	44.82686944	-106.96301389	HIGH VALLEYS	11	11.56807118	0.95089318	FULL SUPPORT
758	NGP150	Goose Creek - Above KOA	10/26/1998	44.83426111	-106.96352500	HIGH VALLEYS	9	11.53164864	0.78046082	INDETERMINATE
759	NGP151	Goose Creek - Above Sheridan W.W.T.F.	10/29/1998	44.82091389	-106.96194167	HIGH VALLEYS	8	11.60234421	0.68951583	INDETERMINATE
1638	NGP151	Goose Creek - Above Sheridan W.W.T.F.	10/28/2004	44.82091389	-106.96194167	HIGH VALLEYS	5	11.49265223	0.43506058	PARTIAL/NON SUPPORT
708	NGP21	Goose Creek - Below KOA	10/26/1998	44.83533889	-106.96133889	HIGH VALLEYS	11	11.49473100	0.95696019	FULL SUPPORT
1633	NGP21	Goose Creek - Below KOA	10/28/2004	44.83533889	-106.96133889	HIGH VALLEYS	3	11.49473100	0.26098914	PARTIAL/NON SUPPORT
709	NGP22	Goose Creek - Lower	10/29/1998	44.91205833	-106.98058889	HIGH VALLEYS	8	11.02553158	0.72558860	INDETERMINATE
1637	NGP0183	GOOSE CREEK - STATION 3717	10/28/2004	44.80648056	-106.95955556	HIGH VALLEYS	8	11.41799489	0.70064841	INDETERMINATE
28	MRC28	GRANITE CREEK	9/27/1993	44.57694444	-107.54527778	SEDIMENTARY MOUNTAINS	12	13.71840121	0.87473750	FULL SUPPORT
1007	MRC28	GRANITE CREEK	9/12/2000	44.57694444	-107.54527778	SEDIMENTARY MOUNTAINS	13	13.57418861	0.95769997	FULL SUPPORT
1006	MRC82	Granite Creek Below Antelope Butte Ski Area	9/12/2000	44.61222000	-107.51833300	SEDIMENTARY MOUNTAINS	14	13.71780721	1.02057128	FULL SUPPORT

Appendix C (cont.) – WY RIVPACS O/E values and narrative ratings for 1993-2009 samples. Asterisks designate samples that were outside model experience.

SAMPLEID	STATIONID	WATERBODY NAME	COLLECTION DATE	LAT(N)	LONG(W)	2011 BIOREGION	O	E	OE	NARRATIVE RATING
774	WB36	GRASS CREEK - LOWER (BIGHORN)	8/12/1998	43.91300278	-108.56123611	WYOMING BASIN	6	12.83029419	0.46764321	PARTIAL/NON SUPPORT
1352	WB36	GRASS CREEK - LOWER (BIGHORN)	9/9/2003	43.91300278	-108.56123611	WYOMING BASIN	3	5.24937781	0.57149630	PARTIAL/NON SUPPORT
775	WB37	GRASS CREEK - MIDDLE (BIGHORN)	8/11/1998	43.94713611	-108.70234722	WYOMING BASIN	5	12.96410748	0.38568023	PARTIAL/NON SUPPORT
1353	WB37	GRASS CREEK - MIDDLE (BIGHORN)	9/10/2003	43.94713611	-108.70234722	WYOMING BASIN	5	12.05036097	0.41492533	PARTIAL/NON SUPPORT
1374	WB186	GRASS CREEK - OIL FIELD	9/9/2003	43.94384722	-108.65183611	WYOMING BASIN	3	4.09960358	0.73177807	INDETERMINATE
776	WB38	GRASS CREEK - UPPER (BIGHORN)	8/11/1998	43.89175278	-108.78619722	WYOMING BASIN	4	7.45514408	0.53654228	PARTIAL/NON SUPPORT
1313	MRW0123	Grassy Creek Below Dam	8/5/2002	44.13367222	-110.82283889	VOLCANIC MOUNTAINS & VALLEYS	6	11.00846200	0.54503526	PARTIAL/NON SUPPORT
1391	MRC0102	Graves Creek	8/6/2003	44.66371111	-107.42930278	GRANITIC MOUNTAINS	14	16.84358470	0.83117699	INDETERMINATE
1620	MRW0148	Green River Big Bend	10/12/2005	43.36505278	-109.98556389	SEDIMENTARY MOUNTAINS	9	10.74444905	0.83764183	FULL SUPPORT
1308	WB170	Green River - Cordwood	10/14/2002	41.48000278	-109.41875556	WYOMING BASIN	6	11.77351398	0.50961845	PARTIAL/NON SUPPORT
248	WB2	GREEN RIVER - MIDDLE	10/3/1996	43.07472222	-110.07805556	HIGH VALLEYS	10	11.68516448	0.85578599	INDETERMINATE
250	WB26	GREEN RIVER - NEAR NEW FORK RIVER	9/30/1996	42.57055556	-109.94833333	HIGH VALLEYS	12	11.82977136	1.01438985	FULL SUPPORT
1335	WB0196	Green River - Park	10/15/2002	41.50608611	-109.44530556	WYOMING BASIN	5	12.26935320	0.40751944	PARTIAL/NON SUPPORT
121	MRW50	GREEN RIVER 1 - LOWER	10/3/1996	43.25722222	-110.02416667	HIGH VALLEYS	14	12.41219198	1.12792326	FULL SUPPORT
111	MRW4	GREEN RIVER 1 - UPPER	10/3/1996	43.36611111	-109.98055556	SEDIMENTARY MOUNTAINS	8	10.20142005	0.78420455	INDETERMINATE
1894	MRW4	GREEN RIVER 1 - UPPER	10/7/2009	43.36611111	-109.98055556	SEDIMENTARY MOUNTAINS	11	10.74894308	1.02335643	FULL SUPPORT
1318	MRW0124	Greybull River Four Bear	8/21/2002	44.11211667	-109.23652778	BIGHORN BASIN FOOTHILLS	9	10.18013606	0.88407463	FULL SUPPORT
1317	MRW0125	Greybull River Rose	8/20/2002	44.10838889	-109.16175833	WYOMING BASIN	9	10.15337578	0.88623013	FULL SUPPORT
1699	WB0270	Greybull River Above Highway 16	8/22/2006	44.46718082	-108.06561204	WYOMING BASIN	5	6.68148034	0.74833716	INDETERMINATE
383	MRW21	GREYBULL RIVER - JACK CREEK	8/28/1997	44.11111111	-109.35333333	VOLCANIC MOUNTAINS & VALLEYS	12	10.15256380	1.18196746	FULL SUPPORT
1319	MRW21	GREYBULL RIVER - JACK CREEK	8/21/2002	44.11111111	-109.35333333	VOLCANIC MOUNTAINS & VALLEYS	11	10.15167836	1.08356467	FULL SUPPORT
307	MRW32	GREYBULL RIVER - MIDDLE	9/4/1997	44.10583333	-108.97333333	WYOMING BASIN	9	11.98737352	0.75078999	INDETERMINATE
101	MRW23	GREYS RIVER	9/1/1993	43.14305556	-110.97611111	SEDIMENTARY MOUNTAINS	11	9.78865557	1.12374983	FULL SUPPORT
135	MRW67	GRINNEL CREEK (ABOVE)	9/19/1996	44.49500000	-109.93305556	VOLCANIC MOUNTAINS & VALLEYS	11	9.96014854	1.10440120	FULL SUPPORT
284	MRW67	GRINNEL CREEK (ABOVE)	9/9/1997	44.49500000	-109.93305556	VOLCANIC MOUNTAINS & VALLEYS	12	9.96242336	1.20452621	FULL SUPPORT
1758	MRW67	GRINNEL CREEK (ABOVE)	9/10/2007	44.49500000	-109.93305556	VOLCANIC MOUNTAINS & VALLEYS	11	9.96703420	1.10363823	FULL SUPPORT
156	MRW12	GRINNEL CREEK (BELOW)	9/19/1996	44.49500000	-109.93305556	VOLCANIC MOUNTAINS & VALLEYS	12	9.95861727	1.20498656	FULL SUPPORT
283	MRW12	GRINNEL CREEK (BELOW)	9/9/1997	44.49500000	-109.93305556	VOLCANIC MOUNTAINS & VALLEYS	12	9.95636276	1.20525942	FULL SUPPORT
1864	MRW0165	Gros Ventre West Miners	8/19/2008	43.61224861	-110.46738333	SEDIMENTARY MOUNTAINS	11	9.27196605	1.18637190	FULL SUPPORT
1265	MRW0126	Gros Ventre River Bacon Ridge	8/12/2002	43.46011389	-110.16849722	SEDIMENTARY MOUNTAINS	9	10.03507858	0.89685396	FULL SUPPORT
1316	MRW0127	Gros Ventre River Sunday Peak	8/14/2002	43.51985556	-110.23478611	SEDIMENTARY MOUNTAINS	6	10.04231331	0.59747190	PARTIAL/NON SUPPORT
242	SRI4	HAGGARTY CREEK - ABOVE USGS STATION	8/21/1996	41.15166667	-107.11805556	SOUTHERN ROCKIES	5	18.73072496	0.26694108	PARTIAL/NON SUPPORT
1114	SRI4	HAGGARTY CREEK - ABOVE USGS STATION	9/26/2001	41.15166667	-107.11805556	SOUTHERN ROCKIES	7	18.74830542	0.37336708	PARTIAL/NON SUPPORT
1830	SRI4	HAGGARTY CREEK - ABOVE USGS STATION	9/17/2008	41.15166667	-107.11805556	SOUTHERN ROCKIES	9	18.76019346	0.47973919	PARTIAL/NON SUPPORT
241	SRI3	HAGGARTY CREEK - BELOW FERRIS HAGGARTY MINE	8/21/1996	41.18305556	-107.07694444	SOUTHERN ROCKIES	6	18.75878781	0.31985009	PARTIAL/NON SUPPORT
1115	SRI3	HAGGARTY CREEK - BELOW FERRIS HAGGARTY MINE	9/26/2001	41.18305556	-107.07694444	SOUTHERN ROCKIES	2	18.76303284	0.10659258	PARTIAL/NON SUPPORT
1829	SRI3	HAGGARTY CREEK - BELOW FERRIS HAGGARTY MINE	9/17/2008	41.18305556	-107.07694444	SOUTHERN ROCKIES	5	18.76812780	0.26640910	PARTIAL/NON SUPPORT
1125	SR35	Haggarty Creek - Rudefeha	9/25/2001	41.18819444	-107.07174167	SOUTHERN ROCKIES	13	18.76323728	0.69284419	INDETERMINATE
378	MRC137	HALF OUNCE CREEK	9/18/1997	44.82500000	-107.77166667	SEDIMENTARY MOUNTAINS	9	12.67703943	0.70994494	INDETERMINATE
1052	MRC137	HALF OUNCE CREEK	9/14/2000	44.82500000	-107.77166667	SEDIMENTARY MOUNTAINS	11	13.37563789	0.82239068	INDETERMINATE
1716	MRW0151	Hams FK 7694	9/18/2006	42.19281499	-110.73732907	SEDIMENTARY MOUNTAINS	6	9.83344738	0.61016241	PARTIAL/NON SUPPORT
698	MRW89	HAMS FORK - DITCH	9/17/1998	42.10602778	-110.68584444	WYOMING BASIN	10	10.88673651	0.91854891	FULL SUPPORT
697	MRW88	HAMS FORK - FOREST	9/17/1998	42.19278056	-110.73752778	SEDIMENTARY MOUNTAINS	8	10.31557072	0.77552665	INDETERMINATE
803	WB65	HAMS FORK - GRANGER (GREEN RIVER)	9/16/1998	41.60952222	-110.00822500	WYOMING BASIN	5	13.14091822	0.38049092	PARTIAL/NON SUPPORT
802	WB64	HAMS FORK - LIONS PARK	9/15/1998	41.82815833	-110.53085000	WYOMING BASIN	9	12.72292025	0.70738477	INDETERMINATE
817	WB125	HAMS FORK - LOWER BRIDGE (HWY 30)	9/16/1998	41.74995000	-110.53361944	WYOMING BASIN	7	12.36779410	0.56598614	PARTIAL/NON SUPPORT
146	MRW8	HAMS FORK RIVER - BELOW	10/5/1995	42.20944444	-110.73222222	SEDIMENTARY MOUNTAINS	10	9.89760861	1.01034506	FULL SUPPORT
1619	MRW8	HAMS FORK RIVER - BELOW	10/5/2005	42.20944444	-110.73222222	SEDIMENTARY MOUNTAINS	10	9.84935367	1.01529505	FULL SUPPORT

Assessment of Aquatic Biological Condition Using WY RIVPACS with Comparisons to the Wyoming Stream Integrity Index (WSII)

Appendix C (cont.) – WY RIVPACS O/E values and narrative ratings for 1993-2009 samples. Asterisks designate samples that were outside model experience.

SAMPLEID	STATIONID	WATERBODY NAME	COLLECTION DATE	LAT(N)	LONG(W)	2011 BIOREGION	O	E	OE	NARRATIVE RATING
123	MRW53	HAMS FORK RIVER - CAMPGROUND	10/5/1995	42.25416667	-110.72972222	SEDIMENTARY MOUNTAINS	10	8.94109857	1.11843080	FULL SUPPORT
1053	MRW53	HAMS FORK RIVER - CAMPGROUND	9/25/2000	42.25416667	-110.72972222	SEDIMENTARY MOUNTAINS	9	8.93971314	1.00674371	FULL SUPPORT
1192	MRW53	HAMS FORK RIVER - CAMPGROUND	10/2/2001	42.25416667	-110.72972222	SEDIMENTARY MOUNTAINS	8	8.91333348	0.89753177	FULL SUPPORT
1193	MRW53	HAMS FORK RIVER - CAMPGROUND	9/25/2000	42.25416667	-110.72972222	SEDIMENTARY MOUNTAINS	10	8.93971314	1.11860413	FULL SUPPORT
1328	MRW53	HAMS FORK RIVER - CAMPGROUND	9/23/2002	42.25416667	-110.72972222	SEDIMENTARY MOUNTAINS	9	8.90071674	1.01115452	FULL SUPPORT
1413	MRW53	HAMS FORK RIVER - CAMPGROUND	9/29/2003	42.25416667	-110.72972222	SEDIMENTARY MOUNTAINS	6	8.90071674	0.67410302	PARTIAL/NON SUPPORT
1517	WU0006	Henrys Fork River Below Gaging Station	6/15/2004	41.00712778	-110.26859444	SOUTHERN ROCKIES	13	18.63366463	0.69766201	* INDETERMINATE
92	MRW15	HOBBLE CREEK	9/25/1996	42.36500000	-110.84527778	SEDIMENTARY MOUNTAINS	12	9.88213127	1.21431295	FULL SUPPORT
1702	MRW15	HOBBLE CREEK	9/19/2006	42.36500000	-110.84527778	SEDIMENTARY MOUNTAINS	11	9.89807460	1.11132725	FULL SUPPORT
267	WHP6	HORSE CREEK	10/11/1996	41.42250000	-105.18666667	SE PLAINS	7	8.92828822	0.78402487	FULL SUPPORT
1315	MRW0129	Horse Creek Hoback	8/13/2002	43.34311944	-110.71232500	SEDIMENTARY MOUNTAINS	7	9.53208047	0.73436224	INDETERMINATE
966	WHP26	HORSE CREEK - BELOW DRY CREEK (HC2)	10/7/1999	41.87311944	-104.13921389	SE PLAINS	7	8.92856977	0.78400015	FULL SUPPORT
965	WHP25	HORSE CREEK - BELOW SO. HORSE CK. LATERAL CANAL (H	10/6/1999	41.89321389	-104.09701111	SE PLAINS	7	8.92857040	0.78400009	FULL SUPPORT
1730	WHP0044	HORSE CREEK - FORK CAMP	9/18/2007	41.47300000	-104.71200000	SE PLAINS	10	8.92850001	1.12000896	FULL SUPPORT
926	WB103	Horse Creek Middle/S. 20	10/13/1999	43.58929722	-109.60785000	HIGH VALLEYS	9	12.23485122	0.73560355	INDETERMINATE
950	WB99	Horse Creek Lower/Dubois	10/13/1999	43.54178056	-109.63209167	HIGH VALLEYS	11	11.87404188	0.92639053	FULL SUPPORT
867	MRW98	Horse Creek Upper/Below Burroughs Confluence	9/21/1999	43.66446667	-109.63343056	HIGH VALLEYS	8	9.55616324	0.83715606	INDETERMINATE
1461	MRW98	Horse Creek Upper/Below Burroughs Confluence	10/12/2004	43.66446667	-109.63343056	HIGH VALLEYS	7	9.59067458	0.72987567	INDETERMINATE
970	WHP30	Horse Shoe Creek above North Platte	9/8/1999	42.44722222	-104.96591111	NE PLAINS	5	8.92854376	0.56000174	INDETERMINATE
969	WHP29	Horse Shoe Creek above Pipeline	9/7/1999	42.45833333	-105.10222222	NE PLAINS	9	8.92852191	1.00800559	FULL SUPPORT
971	WHP31	Horse Shoe Creek below Pipeline	9/7/1999	42.45833333	-105.10222222	NE PLAINS	9	8.92852224	1.00800555	FULL SUPPORT
331	MRCI20	HUNTER CREEK - LOWER	9/26/1997	44.32031111	-106.95016944	GRANITIC MOUNTAINS	9	14.02825501	0.64156233	PARTIAL/NON SUPPORT
662	MRCI20	HUNTER CREEK - LOWER	9/18/1998	44.32031111	-106.95016944	GRANITIC MOUNTAINS	12	14.02825501	0.85541644	INDETERMINATE
836	MRCI20	HUNTER CREEK - LOWER	9/8/1999	44.32031111	-106.95016944	GRANITIC MOUNTAINS	14	13.97811828	1.00156543	FULL SUPPORT
1001	MRCI20	HUNTER CREEK - LOWER	9/28/2000	44.32031111	-106.95016944	GRANITIC MOUNTAINS	13	15.32735935	0.84815653	INDETERMINATE
1116	MRCI20	HUNTER CREEK - LOWER	9/12/2001	44.32031111	-106.95016944	GRANITIC MOUNTAINS	14	15.22641566	0.91945474	FULL SUPPORT
1285	MRCI20	HUNTER CREEK - LOWER	9/4/2002	44.32031111	-106.95016944	GRANITIC MOUNTAINS	13	14.73696630	0.88213542	INDETERMINATE
1390	MRCI20	HUNTER CREEK - LOWER	4/29/2003	44.32031111	-106.95016944	GRANITIC MOUNTAINS	10	14.73696630	0.67856571	INDETERMINATE
1501	MRCI20	HUNTER CREEK - LOWER	4/21/2004	44.32031111	-106.95016944	GRANITIC MOUNTAINS	13	16.07180399	0.80886999	INDETERMINATE
329	MRCI19	HUNTER CREEK - UPPER	9/26/1997	44.33475833	-106.97610000	GRANITIC MOUNTAINS	9	14.52055970	0.61981082	PARTIAL/NON SUPPORT
661	MRCI19	HUNTER CREEK - UPPER	9/18/1998	44.33475833	-106.97610000	GRANITIC MOUNTAINS	9	13.94289244	0.64549017	PARTIAL/NON SUPPORT
835	MRCI19	HUNTER CREEK - UPPER	9/21/1999	44.33475833	-106.97610000	GRANITIC MOUNTAINS	8	13.94289244	0.57376904	PARTIAL/NON SUPPORT
1004	MRCI19	HUNTER CREEK - UPPER	9/28/2000	44.33475833	-106.97610000	GRANITIC MOUNTAINS	10	14.67146338	0.68159527	INDETERMINATE
1700	MRW0152	Indian Ck Talus	8/29/2006	42.26188626	-110.71738580	SEDIMENTARY MOUNTAINS	10	8.53974363	1.17099534	FULL SUPPORT
1466	NGP187	INDIAN CREEK - COUNTY ROAD 64	8/10/2004	42.92694167	-104.22677500	NE PLAINS	6	8.92841586	0.67201171	INDETERMINATE
1817	NGP187	INDIAN CREEK - COUNTY ROAD 64	8/14/2008	42.92694167	-104.22677500	NE PLAINS	6	8.92845144	0.67200903	INDETERMINATE
1593	NGP194	INDIAN CREEK - TABLE MOUNTAIN	6/8/2005	42.95346667	-104.19901389	NE PLAINS	5	8.92852106	0.56000316	INDETERMINATE
336	MRE10	INYAN KARA CREEK	10/2/1997	44.22583333	-104.42500000	BLACK HILLS	7	8.92854616	0.78400222	INDETERMINATE
1854	MRE0025	Inyan Kara Creek - Dark Canyon	10/6/2008	44.25929808	-104.52368721	BLACK HILLS	3	10.45994226	0.28680847	* PARTIAL/NON SUPPORT
1451	SR0038	Jack Creek	6/10/2004	41.29113333	-107.12156111	SOUTHERN FOOTHILLS & LARAMIE RANGE	11	15.86473155	0.69336187	INDETERMINATE
234	SR5	JACK CREEK - CAMPGROUND	8/27/1996	41.28444444	-107.11916667	SOUTHERN FOOTHILLS & LARAMIE RANGE	16	14.24887743	1.12289548	FULL SUPPORT
1827	SR0058	JACK CREEK - GUARD STATION	9/16/2008	41.27766670	-107.11668604	SOUTHERN FOOTHILLS & LARAMIE RANGE	19	15.80853369	1.20188250	FULL SUPPORT
731	NGP110	JENKS CREEK	10/6/1998	44.61743333	-106.84260000	HIGH VALLEYS	7	8.54532510	0.81916135	INDETERMINATE
983	MRC90	Jenks Creek Above Peno Creek	11/2/2000	44.58452778	-106.85553333	HIGH VALLEYS	8	8.28074268	0.96609692	* FULL SUPPORT
982	MRC91	Jenks Creek Below Peno Creek	11/2/2000	44.58891389	-106.84906944	HIGH VALLEYS	8	8.41904318	0.95022675	* FULL SUPPORT
1222	WB161	Kirby Creek-Blue Springs	9/11/2001	43.72604167	-107.95725833	WYOMING BASIN	1	6.60523113	0.15139516	PARTIAL/NON SUPPORT
1221	WB160	Kirby Creek- Kirby Ditch	9/11/2001	43.73839444	-108.13903333	WYOMING BASIN	4	4.72378374	0.84677882	FULL SUPPORT
49	MRCI27	L. N.F.K. CRAZY WOMAN CRK.	10/6/1993	44.19809167	-106.77617778	SOUTHERN ROCKIES	11	13.61709937	0.80780787	INDETERMINATE

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SAMPLEID	STATIONID	WATERBODY NAME	COLLECTION DATE	LAT(N)	LONG(W)	2011 BIOREGION	O	E	OE	NARRATIVE RATING
666	MRC127	L. N.FK. CRAZY WOMAN CRK.	9/24/1998	44.19809167	-106.77617778	SOUTHERN ROCKIES	10	13.64585237	0.73282341	INDETERMINATE
1846	MRC127	L. N.FK. CRAZY WOMAN CRK.	9/17/2008	44.19809167	-106.77617778	SOUTHERN ROCKIES	7	13.69948030	0.51096829	PARTIAL/NON SUPPORT
390	SR19	LA BONTE CREEK - CURTIS GULCH	10/8/1997	42.40694444	-105.62416667	SOUTHERN FOOTHILLS & LARAMIE RANGE	11	8.90303676	1.23553348	FULL SUPPORT
1478	SR19	LA BONTE CREEK - CURTIS GULCH	10/14/2004	42.40694444	-105.62416667	SOUTHERN FOOTHILLS & LARAMIE RANGE	11	9.39560682	1.17075993	FULL SUPPORT
1832	SR19	LA BONTE CREEK - CURTIS GULCH	10/15/2008	42.40694444	-105.62416667	SOUTHERN FOOTHILLS & LARAMIE RANGE	9	9.41075548	0.95635255	FULL SUPPORT
1589	NGP195	LA PRELE CREEK - FORT FETTERMAN	9/22/2005	42.82406000	-105.49747000	NE PLAINS	6	8.92852019	0.67200386	INDETERMINATE
239	SR110	LA PRELE CREEK - LOWER	10/16/1996	42.73361111	-105.61444444	NE PLAINS	10	8.92811207	1.12005762	FULL SUPPORT
367	MRW52	LABARGE CREEK	9/17/1997	42.40638889	-110.56083333	SEDIMENTARY MOUNTAINS	12	9.38860821	1.27814472	FULL SUPPORT
138	MRW7	LABARGE CREEK - LOWER	9/28/1996	42.40305556	-110.56055556	SEDIMENTARY MOUNTAINS	11	9.39790969	1.17047305	FULL SUPPORT
1705	MRW7	LABARGE CREEK - LOWER	9/26/2006	42.40305556	-110.56055556	SEDIMENTARY MOUNTAINS	5	9.42456197	0.53052864	PARTIAL/NON SUPPORT
1874	MRW0167	LaBarge Creek Mount Thompson	9/30/2008	42.49538056	-110.63333333	SEDIMENTARY MOUNTAINS	11	8.96724922	1.22668610	FULL SUPPORT
100	MRW22	LABARGE CREEK - UPPER	9/28/1996	42.52111111	-110.69888889	SEDIMENTARY MOUNTAINS	10	10.93222657	0.91472674	FULL SUPPORT
1704	MRW22	LABARGE CREEK - UPPER	9/27/2006	42.52111111	-110.69888889	SEDIMENTARY MOUNTAINS	8	10.94491965	0.73093273	INDETERMINATE
1871	MRW22	LABARGE CREEK - UPPER	10/1/2008	42.52111111	-110.69888889	SEDIMENTARY MOUNTAINS	8	9.32093203	0.85828327	FULL SUPPORT
29	MRC29	LAKE CREEK	9/29/1993	44.19333333	-107.20722222	SEDIMENTARY MOUNTAINS	17	16.16749066	1.05149280	FULL SUPPORT
163	MRW124	LAMAR RIVER - LOWER	9/13/1994	44.90083333	-110.25555556	VOLCANIC MOUNTAINS & VALLEYS	9	11.28634254	0.79742396	INDETERMINATE
112	MRW41	LAMAR RIVER - UPPER	9/13/1994	44.86083333	-110.18638889	VOLCANIC MOUNTAINS & VALLEYS	12	11.29590638	1.06233175	FULL SUPPORT
1917	SR0064	LAPRELE CREEK - TWIN PEAKS	9/28/2009	42.49064060	-105.80952110	SOUTHERN FOOTHILLS & LARAMIE RANGE	11	10.10010406	1.08909769	FULL SUPPORT
255	WB115	LARAMIE RIVER - ABOVE	9/13/1996	41.30111111	-105.60805556	WYOMING BASIN	6	8.92755761	0.67207631	INDETERMINATE
1906	WB0323	LARAMIE RIVER - ABOVE LARAMIE WWTF	8/26/2009	41.33782080	-105.59610240	WYOMING BASIN	7	8.92765312	0.78408064	INDETERMINATE
1825	SR0056	LARAMIE RIVER - ABOVE SHELLROCK CREEK	9/8/2008	41.04661663	-106.03324067	SOUTHERN FOOTHILLS & LARAMIE RANGE	13	12.41204794	1.04736946	FULL SUPPORT
1908	WB0321	LARAMIE RIVER - ABOVE UPRR TIE PLANT	8/28/2009	41.29620080	-105.61184050	WYOMING BASIN	9	8.92740868	1.00813129	FULL SUPPORT
263	WB120	LARAMIE RIVER - BELOW	9/13/1996	41.33611111	-105.59611111	WYOMING BASIN	7	8.92785142	0.78406323	INDETERMINATE
1905	WB0324	LARAMIE RIVER - BELOW GRAVEL PITS	8/25/2009	41.37408280	-105.58977910	WYOMING BASIN	7	8.92775436	0.78407175	INDETERMINATE
1043	WB126	Laramie River - Below Laramie WWTF	10/12/2000	41.36826111	-105.59404167	WYOMING BASIN	4	8.92792351	0.44803251	PARTIAL/NON SUPPORT
1907	WB0322	LARAMIE RIVER - BELOW SPRING CREEK	8/27/2009	41.30914530	-105.60540930	WYOMING BASIN	7	8.92752070	0.78409227	INDETERMINATE
1497	WHP40	LARAMIE RIVER - BELOW SYBILLE CREEK	7/28/2004	42.10875556	-105.08619444	SE PLAINS	7	8.92845328	0.78401037	FULL SUPPORT
1729	SR0055	LARAMIE RIVER - BELOW WHEATLAND TUNNEL	9/10/2007	41.92616279	-105.41636814	SOUTHERN FOOTHILLS & LARAMIE RANGE	9	11.41850843	0.78819401	INDETERMINATE
316	SR14	LARAMIE RIVER - JELM	9/12/1997	41.07972222	-106.01194444	SOUTHERN FOOTHILLS & LARAMIE RANGE	15	12.45577637	1.20426054	FULL SUPPORT
1044	WB125	Laramie River - Monolith	10/13/2000	41.25694167	-105.66710278	WYOMING BASIN	7	8.92755659	0.78408912	INDETERMINATE
1909	SR0062	LARAMIE RIVER - SUGAR LOAF	9/2/2009	41.93309290	-105.37084330	SOUTHERN FOOTHILLS & LARAMIE RANGE	8	10.81657779	0.73960546	INDETERMINATE
114	MRW44	LAVA CREEK	9/14/1994	44.93555556	-110.62416667	VOLCANIC MOUNTAINS & VALLEYS	9	11.68486535	0.77022710	INDETERMINATE
136	MRW68	LIBBY CREEK (ABOVE)	9/19/1996	44.46055556	-109.86166667	VOLCANIC MOUNTAINS & VALLEYS	15	14.37086859	1.04377825	FULL SUPPORT
286	MRW68	LIBBY CREEK (ABOVE)	9/9/1997	44.46055556	-109.86166667	VOLCANIC MOUNTAINS & VALLEYS	16	14.36759867	1.11361685	FULL SUPPORT
168	MRW13	LIBBY CREEK (BELOW)	9/1/1996	44.45972222	-109.86416667	VOLCANIC MOUNTAINS & VALLEYS	4	13.84459878	0.28892134	PARTIAL/NON SUPPORT
285	MRW13	LIBBY CREEK (BELOW)	9/9/1997	44.45972222	-109.86416667	VOLCANIC MOUNTAINS & VALLEYS	16	13.84459878	1.15568535	FULL SUPPORT
1464	NGP186	LIGHTNING CREEK	6/2/2004	43.20782500	-104.66180278	NE PLAINS	3	8.92856545	0.33600022	PARTIAL/NON SUPPORT
1591	NGP186	LIGHTNING CREEK	6/6/2005	43.20782500	-104.66180278	NE PLAINS	4	8.92856451	0.44800035	PARTIAL/NON SUPPORT
1810	NGP0216	LIGHTNING CREEK - BELOW TWENTYMILE CREEK	6/12/2008	43.20036100	-104.71814400	NE PLAINS	1	8.92851700	0.11200068	PARTIAL/NON SUPPORT
1679	NGP201	LIGHTNING CREEK - SPLIT HILL	6/13/2006	43.16229700	-104.92331900	NE PLAINS	5	8.92855943	0.56000075	INDETERMINATE
1651	MRW0150	Little Bear Creek	8/16/2006	44.94120000	-109.55960000	GRANITIC MOUNTAINS	7	13.07543804	0.53535491	PARTIAL/NON SUPPORT
937	WB86	Little Beaver Lower (confluence)	8/12/1999	42.51672222	-108.49916111	WYOMING BASIN	8	8.36474562	0.95639489	FULL SUPPORT
988	MRC87	Little Bighorn Headwaters	9/18/2000	44.79872222	-107.76512778	SEDIMENTARY MOUNTAINS	9	12.77265479	0.70463033	INDETERMINATE
9	MRC18	LITTLE BIGHORN RIVER	10/27/1993	44.98688333	-107.63868056	HIGH VALLEYS	10	12.34917285	0.80977083	INDETERMINATE
10	MRC18	LITTLE BIGHORN RIVER	10/21/1994	44.98688333	-107.63868056	HIGH VALLEYS	12	12.89664965	0.93047422	FULL SUPPORT
11	MRC18	LITTLE BIGHORN RIVER	10/20/1995	44.98688333	-107.63868056	HIGH VALLEYS	12	12.85080401	0.93379371	FULL SUPPORT
12	MRC18	LITTLE BIGHORN RIVER	9/27/1996	44.98688333	-107.63868056	HIGH VALLEYS	10	12.34917285	0.80977083	INDETERMINATE
354	MRC18	LITTLE BIGHORN RIVER	10/15/1997	44.98688333	-107.63868056	HIGH VALLEYS	11	12.36196652	0.88982606	FULL SUPPORT

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SAMPLEID	STATIONID	WATERBODY NAME	COLLECTION DATE	LAT(N)	LONG(W)	2011 BIOREGION	O	E	OE	NARRATIVE RATING
616	MRC18	LITTLE BIGHORN RIVER	10/9/1998	44.98688333	-107.63868056	HIGH VALLEYS	14	12.84850167	1.08962121	FULL SUPPORT
827	MRC18	LITTLE BIGHORN RIVER	10/11/1999	44.98688333	-107.63868056	HIGH VALLEYS	12	12.85027491	0.93383216	FULL SUPPORT
1002	MRC18	LITTLE BIGHORN RIVER	9/18/2000	44.98688333	-107.63868056	HIGH VALLEYS	12	13.35858156	0.89829897	FULL SUPPORT
1079	MRC18	LITTLE BIGHORN RIVER	10/8/2001	44.98688333	-107.63868056	HIGH VALLEYS	15	12.84775375	1.16751926	FULL SUPPORT
1304	MRC18	LITTLE BIGHORN RIVER	10/15/2002	44.98688333	-107.63868056	HIGH VALLEYS	12	12.84941216	0.93389486	FULL SUPPORT
1368	MRC18	LITTLE BIGHORN RIVER	9/30/2003	44.98688333	-107.63868056	HIGH VALLEYS	12	12.84941216	0.93389486	FULL SUPPORT
1785	MRC18	LITTLE BIGHORN RIVER	10/17/2007	44.98688333	-107.63868056	HIGH VALLEYS	15	12.34984174	1.21459046	FULL SUPPORT
985	MRC83	Little Bighorn River Above Dry Fork	9/19/2000	44.94875000	-107.68108330	SEDIMENTARY MOUNTAINS	13	12.87608558	1.00962361	FULL SUPPORT
987	MRC86	Little Bighorn River Below Dayton Gulch	9/14/2000	44.84126667	-107.75403889	SEDIMENTARY MOUNTAINS	15	13.66850387	1.09741345	FULL SUPPORT
986	MRC84	Little Bighorn River Below Wagon Box Creek	9/13/2000	44.88619167	-107.74355556	SEDIMENTARY MOUNTAINS	9	13.01411978	0.69155657	INDETERMINATE
1687	SR44	LITTLE BRUSH CREEK - SLASH RIDGE	8/28/2006	41.35511700	-106.42443900	SOUTHERN ROCKIES	22	18.75454536	1.17304896	FULL SUPPORT
1031	MRE18	Little Creek - F.S. Boundary	8/30/2000	44.60746667	-104.39073056	BLACK HILLS	10	9.59957012	1.04171331	FULL SUPPORT
1933	MRE18	Little Creek - F.S. Boundary	9/15/2009	44.60746667	-104.39073056	BLACK HILLS	11	10.16120746	1.08254851 *	FULL SUPPORT
37	MRC38	LITTLE GOOSE CREEK	10/1/1996	44.62665556	-107.03036111	HIGH VALLEYS	13	12.96541893	1.00266718	FULL SUPPORT
622	MRC38	LITTLE GOOSE CREEK	10/27/1998	44.62665556	-107.03036111	HIGH VALLEYS	12	12.82043778	0.93600548	FULL SUPPORT
201	NGPI20	LITTLE GOOSE CREEK - ABOVE SHERIDAN	10/24/1994	44.77080833	-106.95066389	HIGH VALLEYS	8	14.23037079	0.56217790	PARTIAL/NON SUPPORT
736	NGPI20	LITTLE GOOSE CREEK - ABOVE SHERIDAN	10/26/1998	44.77080833	-106.95066389	HIGH VALLEYS	8	14.29800551	0.55951860	PARTIAL/NON SUPPORT
1634	NGPI20	LITTLE GOOSE CREEK - ABOVE SHERIDAN	10/26/2004	44.77080833	-106.95066389	HIGH VALLEYS	6	14.30190971	0.41952439	PARTIAL/NON SUPPORT
374	NGPI36	LITTLE GOOSE CREEK - COFFEEN	10/8/1997	44.78533889	-106.94336667	HIGH VALLEYS	7	14.29714724	0.48960816	PARTIAL/NON SUPPORT
743	NGPI36	LITTLE GOOSE CREEK - COFFEEN	10/27/1998	44.78533889	-106.94336667	HIGH VALLEYS	7	14.29714724	0.48960816	PARTIAL/NON SUPPORT
760	NGPI52	Little Goose Creek - Highway 87	10/27/1998	44.71161111	-106.95876944	HIGH VALLEYS	10	14.26039474	0.70124286	INDETERMINATE
205	NGPI26	LITTLE GOOSE CREEK - SHERIDAN	10/25/1994	44.78624444	-106.94205000	HIGH VALLEYS	5	14.08519362	0.42597923	PARTIAL/NON SUPPORT
369	NGPI26	LITTLE GOOSE CREEK - SHERIDAN	10/8/1997	44.78624444	-106.94205000	HIGH VALLEYS	6	14.29631582	0.34974046	PARTIAL/NON SUPPORT
739	NGPI26	LITTLE GOOSE CREEK - SHERIDAN	10/27/1998	44.78624444	-106.94205000	HIGH VALLEYS	6	14.28991559	0.41987652	PARTIAL/NON SUPPORT
1628	NGPI26	LITTLE GOOSE CREEK - SHERIDAN	10/26/2004	44.78624444	-106.94205000	HIGH VALLEYS	6	8.83579687	0.67905590	PARTIAL/NON SUPPORT
1635	NGP0181	Little Goose Creek (Station 3734)	10/26/2004	44.79749722	-106.94687778	HIGH VALLEYS	3	14.29570208	0.20985328	PARTIAL/NON SUPPORT
1629	NGP0182	Little Goose Creek (Station 3759)	10/26/2004	44.78230833	-106.95090000	HIGH VALLEYS	3	14.29888546	0.20980656	PARTIAL/NON SUPPORT
89	MRW11	LITTLE GRANITE CREEK Boulder	9/1/1993	43.29888889	-110.52583333	SEDIMENTARY MOUNTAINS	6	8.57018924	0.70010123	INDETERMINATE
1321	MRW11	LITTLE GRANITE CREEK Boulder	8/27/2002	43.29888889	-110.52583333	SEDIMENTARY MOUNTAINS	10	9.03880643	1.10634076	FULL SUPPORT
1889	MRW11	LITTLE GRANITE CREEK Boulder	9/1/2009	43.29888889	-110.52583333	SEDIMENTARY MOUNTAINS	10	9.04058917	1.10612260	FULL SUPPORT
1728	WBO286	LITTLE JACK CREEK - HOMESTEAD	8/29/2007	41.39095800	-107.07667800	WYOMING BASIN	12	8.76178078	1.36958460	FULL SUPPORT
253	WB3	LITTLE LARAMIE RIVER - LINDZEY RANCH	9/12/1996	41.29971944	-105.99415556	SOUTHERN FOOTHILLS & LARAMIE RANGE	15	11.82917645	1.26805108	FULL SUPPORT
313	WB3	LITTLE LARAMIE RIVER - LINDZEY RANCH	9/11/1997	41.29971944	-105.99415556	SOUTHERN FOOTHILLS & LARAMIE RANGE	14	11.84677553	1.18175616	FULL SUPPORT
767	WB3	LITTLE LARAMIE RIVER - LINDZEY RANCH	9/16/1998	41.29971944	-105.99415556	SOUTHERN FOOTHILLS & LARAMIE RANGE	13	11.84677553	1.09734501	FULL SUPPORT
929	WB3	LITTLE LARAMIE RIVER - LINDZEY RANCH	9/23/1999	41.29971944	-105.99415556	SOUTHERN FOOTHILLS & LARAMIE RANGE	12	11.77803798	1.01884542	FULL SUPPORT
1028	WB3	LITTLE LARAMIE RIVER - LINDZEY RANCH	10/4/2000	41.29971944	-105.99415556	SOUTHERN FOOTHILLS & LARAMIE RANGE	14	11.86068726	1.18037005	FULL SUPPORT
1117	WB3	LITTLE LARAMIE RIVER - LINDZEY RANCH	9/13/2001	41.29971944	-105.99415556	SOUTHERN FOOTHILLS & LARAMIE RANGE	12	11.85573684	1.01216822	FULL SUPPORT
1253	WB3	LITTLE LARAMIE RIVER - LINDZEY RANCH	9/5/2002	41.29971944	-105.99415556	SOUTHERN FOOTHILLS & LARAMIE RANGE	9	11.84532216	0.75979360	INDETERMINATE
1920	WB3	LITTLE LARAMIE RIVER - LINDZEY RANCH	10/15/2009	41.29971944	-105.99415556	SOUTHERN FOOTHILLS & LARAMIE RANGE	12	11.86001824	1.01180283	FULL SUPPORT
398	WBI14	LITTLE MEDICINE BOW RIVER	10/6/1997	42.32722222	-106.15361111	WYOMING BASIN	8	8.92575949	0.89628227	FULL SUPPORT
1737	WBO282	LITTLE MEDICINE BOW RIVER - BIG CHARLIE LAKES	7/16/2007	42.17604700	-106.07445800	WYOMING BASIN	5	11.09410829	0.45068967	PARTIAL/NON SUPPORT
1812	WBO282	LITTLE MEDICINE BOW RIVER - BIG CHARLIE LAKES	7/14/2008	42.17604700	-106.07445800	WYOMING BASIN	5	10.85112709	0.46078163	PARTIAL/NON SUPPORT
1735	WBO281	LITTLE MEDICINE BOW RIVER - BOLES SPRINGS	7/16/2007	41.96110150	-106.20928320	WYOMING BASIN	5	12.55765323	0.39816357	PARTIAL/NON SUPPORT
1738	WBO285	LITTLE MEDICINE BOW RIVER - BRENNAN DRAW	7/23/2007	42.38061700	-106.08911100	WYOMING BASIN	7	8.36254166	0.83706608	FULL SUPPORT
1816	WBO285	LITTLE MEDICINE BOW RIVER - BRENNAN DRAW	7/17/2008	42.38061700	-106.08911100	WYOMING BASIN	9	8.40093669	1.07130911	FULL SUPPORT
1772	WBO284	LITTLE MEDICINE BOW RIVER - LANDING FIELD	7/18/2007	42.36378600	-106.13006900	WYOMING BASIN	9	8.50151940	1.05863429	FULL SUPPORT
1815	WBO284	LITTLE MEDICINE BOW RIVER - LANDING FIELD	7/16/2008	42.36378600	-106.13006900	WYOMING BASIN	8	8.46040164	0.94558159	FULL SUPPORT
1770	WBO283	LITTLE MEDICINE BOW RIVER - RECONSTRUCTED CHANNEL	7/17/2007	42.30688300	-106.16265600	WYOMING BASIN	9	10.41891365	0.86381367	FULL SUPPORT

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Appendix C (cont.) – WY RIVPACS O/E values and narrative ratings for 1993-2009 samples. Asterisks designate samples that were outside model experience.

SAMPLEID	STATIONID	WATERBODY NAME	COLLECTION DATE	LAT(N)	LONG(W)	2011 BIOREGION	O	E	OE	NARRATIVE RATING
1814	WBO283	LITTLE MEDICINE BOW RIVER - RECONSTRUCTED CHANNEL	7/15/2008	42.30688300	-106.16265600	WYOMING BASIN	7	10.42471051	0.67148148	INDETERMINATE
1289	NGP0167	Little Missouri River	9/16/2002	44.98285000	-104.49501667	NE PLAINS	2	8.92853197	0.22400099	PARTIAL/NON SUPPORT
1290	NGP0168	Little Missouri River	9/16/2002	44.93589444	-104.60847500	NE PLAINS	4	8.92855398	0.44800088	PARTIAL/NON SUPPORT
1291	NGP0170	Little Missouri River	9/17/2002	44.89327222	-104.70580000	NE PLAINS	5	8.92856770	0.56000023	INDETERMINATE
1292	NGP0169	Little Missouri River	9/17/2002	44.91538611	-104.67181389	NE PLAINS	5	8.92856771	0.56000023	INDETERMINATE
1718	WBO293	Little Muddy Creek Below Sheep Creek	5/10/2007	41.60969440	-110.69728000	WYOMING BASIN	6	11.24317892	0.53365690	PARTIAL/NON SUPPORT
1515	WBO234	Little Muddy Creek Haul Road	5/25/2004	41.56370278	-110.63250833	WYOMING BASIN	1	12.79069317	0.07818185	PARTIAL/NON SUPPORT
1786	WBO234	Little Muddy Creek Haul Road	5/9/2007	41.56370278	-110.63250833	WYOMING BASIN	4	12.79069317	0.31272738	PARTIAL/NON SUPPORT
372	NGPI34	LITTLE NORTH FORK SHELL CREEK	9/24/1997	44.48222222	-106.83000000	HIGH VALLEYS	6	9.21767722	0.65092320	PARTIAL/NON SUPPORT
639	MRC55	Little Piney Creek - Lower	10/2/1998	44.52911667	-106.81895278	HIGH VALLEYS	10	12.49874688	0.80008021	INDETERMINATE
640	MRC56	Little Piney Creek - Upper	10/2/1998	44.55084167	-106.88288333	SOUTHERN ROCKIES	11	14.28047544	0.77028248	INDETERMINATE
1709	WBO272	Little Popo Agie Batrum	10/18/2006	42.81496458	-108.65268771	HIGH VALLEYS	11	11.78504161	0.93338661	FULL SUPPORT
1608	MRW0146	Little Popo Agie Maxon Basin	8/22/2005	42.60696111	-108.84638056	GRANITIC MOUNTAINS	15	18.01595524	0.83259532	INDETERMINATE
1713	WBO271	Little Popo Agie Above Dallas D.	10/16/2006	42.74288536	-108.61609539	SOUTHERN FOOTHILLS & LARAMIE RANGE	11	11.72763848	0.93795524	FULL SUPPORT
813	WB76	LITTLE POPO AGIE RIVER - Above Twin	10/15/1998	42.73644167	-108.61871667	HIGH VALLEYS	12	11.78969801	1.01783778	FULL SUPPORT
1708	WB76	LITTLE POPO AGIE RIVER - Above Twin	10/11/2006	42.73644167	-108.61871667	HIGH VALLEYS	12	11.72551141	1.02340952	FULL SUPPORT
814	WB77	LITTLE POPO AGIE RIVER - DALLAS	10/14/1998	42.74747778	-108.61676389	SOUTHERN FOOTHILLS & LARAMIE RANGE	11	14.52914224	0.75709906	INDETERMINATE
1711	WB77	LITTLE POPO AGIE RIVER - DALLAS	10/11/2006	42.74747778	-108.61676389	SOUTHERN FOOTHILLS & LARAMIE RANGE	4	13.74384988	0.29103927	PARTIAL/NON SUPPORT
815	WB78	LITTLE POPO AGIE RIVER - Hudson	10/15/1998	42.89831389	-108.59018611	HIGH VALLEYS	9	11.59635442	0.77610598	INDETERMINATE
1710	WB78	LITTLE POPO AGIE RIVER - Hudson	10/19/2006	42.89831389	-108.59018611	HIGH VALLEYS	6	8.93436814	0.67156400	PARTIAL/NON SUPPORT
314	MRW47	LITTLE POPO AGIE RIVER - RED CANYON	9/11/1997	42.69141667	-108.66380278	HIGH VALLEYS	13	11.88775961	1.09356182	FULL SUPPORT
685	MRW47	LITTLE POPO AGIE RIVER - RED CANYON	10/23/1998	42.69141667	-108.66380278	HIGH VALLEYS	11	11.44531335	0.96109208	FULL SUPPORT
1712	MRW47	LITTLE POPO AGIE RIVER - RED CANYON	10/10/2006	42.69141667	-108.66380278	HIGH VALLEYS	7	10.91315393	0.64142777	PARTIAL/NON SUPPORT
187	NGP1	LITTLE POWDER RIVER	10/17/1995	44.43888889	-105.45916667	NE PLAINS	8	8.92748598	0.89610894	FULL SUPPORT
1481	NGP1	LITTLE POWDER RIVER	9/7/2004	44.43888889	-105.45916667	NE PLAINS	4	8.92715272	0.44807120	PARTIAL/NON SUPPORT
1856	NGP1	LITTLE POWDER RIVER	10/7/2008	44.43888889	-105.45916667	NE PLAINS	5	8.92714986	0.56008918	INDETERMINATE
208	NGPI29	LITTLE POWDER RIVER - ABOVE	10/17/1995	44.61555556	-105.29000000	NE PLAINS	5	8.92856210	0.56000059	INDETERMINATE
370	NGPI29	LITTLE POWDER RIVER - ABOVE	10/29/1997	44.61555556	-105.29000000	NE PLAINS	6	8.92855289	0.67200140	INDETERMINATE
887	NGP58	Little Powder River - Above Dry Creek	10/6/1999	44.95077500	-105.35013611	NE PLAINS	7	8.92854188	0.78400259	FULL SUPPORT
888	NGP59	Little Powder River - Above Olmstead Creek	10/5/1999	44.92005833	-105.35407778	NE PLAINS	5	8.92854555	0.56000162	INDETERMINATE
210	NGPI30	LITTLE POWDER RIVER - BELOW	10/17/1995	44.61583333	-105.29000000	NE PLAINS	1	8.92856148	0.11200012	PARTIAL/NON SUPPORT
362	NGPI30	LITTLE POWDER RIVER - BELOW	10/20/1997	44.61583333	-105.29000000	NE PLAINS	8	8.92855086	0.89600206	FULL SUPPORT
890	NGP61	Little Powder River - Below 85 Creek	10/4/1999	44.92292222	-105.34710278	NE PLAINS	6	8.92854565	0.67200194	INDETERMINATE
889	NGP60	Little Powder River - Below Dry Trail Creek	10/6/1999	44.98878889	-105.34000000	NE PLAINS	7	8.92853547	0.78400316	FULL SUPPORT
1652	WBO263	Little Rock Creek	8/14/2006	44.89970000	-109.27480000	WYOMING BASIN	9	10.47541599	0.85915442	FULL SUPPORT
798	WB60	LITTLE SANDY - LOWER	9/2/1998	42.36778889	-109.23714167	WYOMING BASIN	7	11.84790671	0.59082167	PARTIAL/NON SUPPORT
1373	WB60	LITTLE SANDY - LOWER	9/3/2003	42.36778889	-109.23714167	WYOMING BASIN	4	11.02064210	0.36295526	PARTIAL/NON SUPPORT
1474	WB60	LITTLE SANDY - LOWER	9/2/2004	42.36778889	-109.23714167	WYOMING BASIN	5	13.83242310	0.36146957	PARTIAL/NON SUPPORT
696	MRW87	LITTLE SANDY - UPPER	9/1/1998	42.53233056	-109.21099722	HIGH VALLEYS	18	16.95278223	1.06177262	FULL SUPPORT
134	MRW66	LITTLE SANDY CREEK	9/27/1996	42.53305556	-109.20555556	HIGH VALLEYS	17	16.85702173	1.00848182	FULL SUPPORT
1794	MRW66	LITTLE SANDY CREEK	9/24/2007	42.53305556	-109.20555556	HIGH VALLEYS	15	17.65136190	0.84979279	INDETERMINATE
1471	WB184	LITTLE SANDY RIVER - ABOVE DIVERSION	9/1/2004	42.33884722	-109.25274722	WYOMING BASIN	2	13.83793104	0.14453028	PARTIAL/NON SUPPORT
1599	WB184	LITTLE SANDY RIVER - ABOVE DIVERSION	8/29/2005	42.33884722	-109.25274722	WYOMING BASIN	1	13.83793104	0.07226514	PARTIAL/NON SUPPORT
1775	WB184	LITTLE SANDY RIVER - ABOVE DIVERSION	8/20/2007	42.33884722	-109.25274722	WYOMING BASIN	1	9.83125491	0.10171641	PARTIAL/NON SUPPORT
1820	WB184	LITTLE SANDY RIVER - ABOVE DIVERSION	8/25/2008	42.33884722	-109.25274722	WYOMING BASIN	0	11.61278130	0.00000000	PARTIAL/NON SUPPORT
1495	WB222	LITTLE SANDY RIVER - ABOVE WILLOW EXCLOSURE	9/1/2004	42.34153333	-109.25001111	WYOMING BASIN	2	13.84608291	0.14444518	PARTIAL/NON SUPPORT
1582	WB222	LITTLE SANDY RIVER - ABOVE WILLOW EXCLOSURE	8/29/2005	42.34153333	-109.25001111	WYOMING BASIN	3	14.62271200	0.20516030	PARTIAL/NON SUPPORT
1777	WB222	LITTLE SANDY RIVER - ABOVE WILLOW EXCLOSURE	8/20/2007	42.34153333	-109.25001111	WYOMING BASIN	0	9.82400186	0.00000000	PARTIAL/NON SUPPORT

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SAMPLEID	STATIONID	WATERBODY NAME	COLLECTION DATE	LAT(N)	LONG(W)	2011 BIOREGION	O	E	OE	NARRATIVE RATING
1818	WB222	LITTLE SANDY RIVER - ABOVE WILLOW EXCLOSURE	8/25/2008	42.34153333	-109.25001111	WYOMING BASIN	2	11.59240265	0.17252679	PARTIAL/NON SUPPORT
1469	WB223	LITTLE SANDY RIVER - BELOW WILLOW EXCLOSURE	8/31/2004	42.32031111	-109.26785833	WYOMING BASIN	3	13.12370923	0.22859391	PARTIAL/NON SUPPORT
1584	WB223	LITTLE SANDY RIVER - BELOW WILLOW EXCLOSURE	9/1/2005	42.32031111	-109.26785833	WYOMING BASIN	1	13.84194003	0.07224421	PARTIAL/NON SUPPORT
1778	WB223	LITTLE SANDY RIVER - BELOW WILLOW EXCLOSURE	8/20/2007	42.32031111	-109.26785833	WYOMING BASIN	1	9.77230785	0.10232997	PARTIAL/NON SUPPORT
1822	WB223	LITTLE SANDY RIVER - BELOW WILLOW EXCLOSURE	8/25/2008	42.32031111	-109.26785833	WYOMING BASIN	2	11.05376524	0.18093382	PARTIAL/NON SUPPORT
1351	WB185	LITTLE SANDY RIVER - ELK DITCH	9/5/2003	42.46626389	-109.25822778	WYOMING BASIN	10	14.82205985	0.67467006	INDETERMINATE
311	WB13	LITTLE SAVERY CREEK - GRIZZLY RANCH	9/10/1997	41.33222222	-107.37694444	WYOMING BASIN	7	6.75343241	1.03650997	FULL SUPPORT
641	MRC57	Little Sourdough Creek - Elgin Road Crossing	9/23/1998	44.24445833	-106.91658333	GRANITIC MOUNTAINS	4	14.09984814	0.28369100	PARTIAL/NON SUPPORT
1386	MRC57	Little Sourdough Creek - Elgin Road Crossing	9/16/2003	44.24445833	-106.91658333	GRANITIC MOUNTAINS	5	16.17657430	0.30908893	PARTIAL/NON SUPPORT
642	MRC58	Little Sourdough Creek - Lower	9/23/1998	44.27468333	-106.92172778	GRANITIC MOUNTAINS	13	15.35120021	0.84683932	INDETERMINATE
1059	NGP117	Little Thunder Creek at gage	9/20/2000	43.39204000	-104.54477300	NE PLAINS	3	8.92853792	0.33600126	PARTIAL/NON SUPPORT
1066	NGP122	Little Thunder Creek below LT Reservoir	9/21/2000	43.69031111	-105.37065556	NE PLAINS	5	8.92402248	0.56028546	INDETERMINATE
1058	NGP120	Little Thunder Creek below School Creek	9/20/2000	43.40094100	-105.09370400	NE PLAINS	6	8.92833239	0.67201799	INDETERMINATE
31	MRC30	LITTLE TONGUE RIVER	10/20/1993	44.80916667	-107.28916667	HIGH VALLEYS	13	12.16354254	1.06876759	FULL SUPPORT
1488	MRC30	LITTLE TONGUE RIVER	10/6/2004	44.80916667	-107.28916667	HIGH VALLEYS	13	12.29104311	1.05768078	FULL SUPPORT
45	MRC123	LITTLE TONGUE RIVER - LOWER	10/9/1996	44.87681111	-107.26584722	HIGH VALLEYS	9	9.00937782	0.99895910	FULL SUPPORT
341	MRC123	LITTLE TONGUE RIVER - LOWER	10/9/1997	44.87681111	-107.26584722	HIGH VALLEYS	8	9.00937782	0.88796365	FULL SUPPORT
664	MRC123	LITTLE TONGUE RIVER - LOWER	10/13/1998	44.87681111	-107.26584722	HIGH VALLEYS	11	10.01356348	1.09851004	FULL SUPPORT
1508	MRC123	LITTLE TONGUE RIVER - LOWER	10/6/2004	44.87681111	-107.26584722	HIGH VALLEYS	8	10.01377665	0.79889938	INDETERMINATE
1509	NGP0178	Little Tongue River (Station 4048)	10/7/2004	44.85342222	-107.25928333	HIGH VALLEYS	6	9.09875417	0.65943094	PARTIAL/NON SUPPORT
300	WB124	LITTLEFIELD CREEK - MAC-02	8/13/1997	41.44277778	-107.44833333	WYOMING BASIN	6	5.08884998	1.17904832	FULL SUPPORT
246	SRI8	LOST CREEK - CAMPGROUND	8/22/1996	41.14222222	-107.07444444	SOUTHERN ROCKIES	16	18.73996813	0.85379014	INDETERMINATE
1118	SRI8	LOST CREEK - CAMPGROUND	9/27/2001	41.14222222	-107.07444444	SOUTHERN ROCKIES	19	18.75623309	1.01299658	FULL SUPPORT
1277	SRI8	LOST CREEK - CAMPGROUND	9/25/2002	41.14222222	-107.07444444	SOUTHERN ROCKIES	16	18.75752018	0.85299122	INDETERMINATE
1375	SRI8	LOST CREEK - CAMPGROUND	9/17/2003	41.14222222	-107.07444444	SOUTHERN ROCKIES	19	18.75752018	1.01292707	FULL SUPPORT
628	MRC44	M.Fk. Powder R. above Hazelton Rd.	8/18/1998	43.57614444	-107.14244167	BIGHORN BASIN FOOTHILLS	10	13.98229189	0.71519033	INDETERMINATE
629	MRC45	M.Fk. Powder R. below Hazelton Rd.	8/18/1998	43.57778611	-107.13679722	BIGHORN BASIN FOOTHILLS	13	14.56637447	0.89246641	FULL SUPPORT
140	MRW71	M.FK. SHOSHONE RIVER (ABOVE)	9/19/1996	44.49222222	-109.99583333	VOLCANIC MOUNTAINS & VALLEYS	13	10.42335592	1.24719909	FULL SUPPORT
290	MRW71	M.FK. SHOSHONE RIVER (ABOVE)	9/9/1997	44.49222222	-109.99583333	VOLCANIC MOUNTAINS & VALLEYS	12	10.42563682	1.15100883	FULL SUPPORT
183	MRW16	M.FK. SHOSHONE RIVER (BELOW)	9/19/1996	44.49277778	-109.99333333	VOLCANIC MOUNTAINS & VALLEYS	13	10.42663616	1.24680672	FULL SUPPORT
289	MRW16	M.FK. SHOSHONE RIVER (BELOW)	9/9/1997	44.49277778	-109.99333333	VOLCANIC MOUNTAINS & VALLEYS	12	10.42433356	1.15115273	FULL SUPPORT
1005	MRC81	Mail Creek Above Shell Creek	9/13/2000	44.54102500	-107.46438333	GRANITIC MOUNTAINS	15	15.26219451	0.98282065	FULL SUPPORT
395	WB14	MCCARTY CREEK	9/10/1997	41.36722222	-107.33611111	WYOMING BASIN	7	9.96215495	0.70265922	INDETERMINATE
706	NGP19	Meade Creek	10/7/1998	44.70448611	-106.85769167	HIGH VALLEYS	6	9.53645739	0.62916445	PARTIAL/NON SUPPORT
212	NGP132	MEADOW CREEK - OIL TREATER	4/1/1996	43.59888889	-106.21555556	NE PLAINS	2	8.92502808	0.22408893	PARTIAL/NON SUPPORT
213	NGP132	MEADOW CREEK - OIL TREATER	10/14/1996	43.59888889	-106.21555556	NE PLAINS	5	8.90572801	0.56143641	INDETERMINATE
211	NGP131	MEADOW CREEK (do not use, outside Oct 31 window)	4/1/1996	43.56111111	-106.16388889	NE PLAINS	2	8.90235649	0.22465962	PARTIAL/NON SUPPORT
701	NGP14	Meadow Creek above Salt Creek	10/14/1998	43.57903056	-106.34678611	NE PLAINS	5	8.92274686	0.56036556	INDETERMINATE
870	NGP14	Meadow Creek above Salt Creek	9/1/1999	43.57903056	-106.34678611	NE PLAINS	6	8.90625751	0.67368364	INDETERMINATE
912	NGP83	Meadow Creek below Linch	9/13/1999	43.60098333	-106.22516111	NE PLAINS	1	8.92247755	0.11207649	PARTIAL/NON SUPPORT
235	SR6	MEDICINE BOW RIVER	9/11/1996	41.52555556	-106.39111111	SOUTHERN ROCKIES	23	18.65625656	1.23283039	FULL SUPPORT
1915	WB0325	MEDICINE BOW RIVER - TL RANCH	9/17/2009	41.72096140	-106.25622670	WYOMING BASIN	10	8.92568755	1.12036187	FULL SUPPORT
32	MRC31	MEDICINE LODGE CREEK - LOWER	9/28/1993	44.29972222	-107.53805556	BIGHORN BASIN FOOTHILLS	13	13.53964093	0.96014363	FULL SUPPORT
1505	MRC31	MEDICINE LODGE CREEK - LOWER	9/15/2004	44.29972222	-107.53805556	BIGHORN BASIN FOOTHILLS	15	14.06388743	1.06656144	FULL SUPPORT
1207	WB124	Medicine Lodge Creek - School	9/20/2000	44.24655278	-107.60535556	WYOMING BASIN	4	4.59807051	0.86993011	FULL SUPPORT
1179	MRC0109	Medicine Lodge Creek State Park	9/20/2000	44.29765278	-107.54085000	BIGHORN BASIN FOOTHILLS	15	12.95948054	1.15745380	FULL SUPPORT
38	MRC4	MEDICINE LODGE CREEK - UPPER	9/27/1993	44.41500000	-107.38416667	GRANITIC MOUNTAINS	16	16.78690946	0.95312363	FULL SUPPORT
1482	MRC4	MEDICINE LODGE CREEK - UPPER	9/14/2004	44.41500000	-107.38416667	GRANITIC MOUNTAINS	17	17.56047509	0.96808315	FULL SUPPORT

Assessment of Aquatic Biological Condition Using WY RIVPACS with Comparisons to the Wyoming Stream Integrity Index (WSII)

Appendix C (cont.) – WY RIVPACS O/E values and narrative ratings for 1993-2009 samples. Asterisks designate samples that were outside model experience.

SAMPLEID	STATIONID	WATERBODY NAME	COLLECTION DATE	LAT(N)	LONG(W)	2011 BIOREGION	O	E	OE	NARRATIVE RATING
116	MRW45	MIDDLE CREEK	9/2/1993	44.47776667	-110.03559167	VOLCANIC MOUNTAINS & VALLEYS	10	11.18620446	0.89395827	FULL SUPPORT
117	MRW45	MIDDLE CREEK	9/7/1994	44.47776667	-110.03559167	VOLCANIC MOUNTAINS & VALLEYS	13	11.16890466	1.16394583	FULL SUPPORT
118	MRW45	MIDDLE CREEK	9/21/1995	44.47776667	-110.03559167	VOLCANIC MOUNTAINS & VALLEYS	13	11.15067296	1.16584892	FULL SUPPORT
119	MRW45	MIDDLE CREEK	9/18/1996	44.47776667	-110.03559167	VOLCANIC MOUNTAINS & VALLEYS	14	11.12576580	1.25834035	FULL SUPPORT
386	MRW45	MIDDLE CREEK	8/25/1997	44.47776667	-110.03559167	VOLCANIC MOUNTAINS & VALLEYS	13	11.12576580	1.16845889	FULL SUPPORT
684	MRW45	MIDDLE CREEK	9/3/1998	44.47776667	-110.03559167	VOLCANIC MOUNTAINS & VALLEYS	12	11.13274400	1.07790137	FULL SUPPORT
858	MRW45	MIDDLE CREEK	9/1/1999	44.47776667	-110.03559167	VOLCANIC MOUNTAINS & VALLEYS	10	11.13274400	0.89825114	FULL SUPPORT
999	MRW45	MIDDLE CREEK	9/7/2000	44.47776667	-110.03559167	VOLCANIC MOUNTAINS & VALLEYS	11	11.13781553	0.98762634	FULL SUPPORT
1070	MRW45	MIDDLE CREEK	8/30/2001	44.47776667	-110.03559167	VOLCANIC MOUNTAINS & VALLEYS	11	11.13781553	0.98762634	FULL SUPPORT
1071	MRW45	MIDDLE CREEK	8/27/2002	44.47776667	-110.03559167	VOLCANIC MOUNTAINS & VALLEYS	10	11.18620446	0.89395827	FULL SUPPORT
1283	MRW45	MIDDLE CREEK	8/27/2002	44.47776667	-110.03559167	VOLCANIC MOUNTAINS & VALLEYS	10	11.16527463	0.89563404	FULL SUPPORT
1392	MRW45	MIDDLE CREEK	8/11/2003	44.47776667	-110.03559167	VOLCANIC MOUNTAINS & VALLEYS	11	11.16527463	0.98519744	FULL SUPPORT
1759	MRW45	MIDDLE CREEK	9/11/2007	44.47776667	-110.03559167	VOLCANIC MOUNTAINS & VALLEYS	7	11.11554406	0.62974875	PARTIAL/NON SUPPORT
1840	MRW45	MIDDLE CREEK	8/29/2008	44.47776667	-110.03559167	VOLCANIC MOUNTAINS & VALLEYS	12	11.13414788	1.07776546	FULL SUPPORT
43	MRCI21	MIDDLE FK. CRAZY WOMAN CREEK - GREUB	10/31/1996	44.05219167	-106.75221389	SOUTHERN ROCKIES	11	13.17629685	0.83483244	INDETERMINATE
663	MRCI21	MIDDLE FK. CRAZY WOMAN CREEK - GREUB	9/29/1998	44.05219167	-106.75221389	SOUTHERN ROCKIES	13	13.17629685	0.98662015	FULL SUPPORT
44	NGPI37	MIDDLE FK. CRAZY WOMAN CREEK - HIGH. 87	10/31/1996	44.05157778	-106.69582222	HIGH VALLEYS	12	10.26432423	1.16909791	FULL SUPPORT
744	NGPI37	MIDDLE FK. CRAZY WOMAN CREEK - HIGH. 87	9/29/1998	44.05157778	-106.69582222	HIGH VALLEYS	13	9.74366437	1.33420031	FULL SUPPORT
1389	NGPI37	MIDDLE FK. CRAZY WOMAN CREEK - HIGH. 87	10/27/2003	44.05157778	-106.69582222	HIGH VALLEYS	10	8.86263979	1.12833199	FULL SUPPORT
402	WBI7	MIDDLE FK. POGO AGIE - LANDER	9/9/1997	42.85055556	-108.70166667	HIGH VALLEYS	15	11.99566427	1.25045180	FULL SUPPORT
357	MRC6	MIDDLE FK. POWDER R. - LOWER CANYON A	10/16/1997	43.60250000	-106.90500000	BIGHORN BASIN FOOTHILLS	12	12.98913969	0.92384871	FULL SUPPORT
644	MRC6	MIDDLE FK. POWDER R. - LOWER CANYON A	9/14/1998	43.60250000	-106.90500000	BIGHORN BASIN FOOTHILLS	12	12.98913969	0.92384871	FULL SUPPORT
359	MRC6A	MIDDLE FK. POWDER R. - LOWER CANYON B	10/16/1997	43.60138889	-106.90944444	BIGHORN BASIN FOOTHILLS	11	12.98947200	0.84683966	FULL SUPPORT
228	SR21	MIDDLE FORK BIG CREEK	9/4/1996	41.00833333	-106.57194444	SOUTHERN FOOTHILLS & LARAMIE RANGE	16	14.40353728	1.11083824	FULL SUPPORT
1695	WB257	MIDDLE FORK CASPER CREEK - BROAD MESA	10/5/2006	42.95587902	-107.04145554	WYOMING BASIN	0	8.68176888	0.00000000	PARTIAL/NON SUPPORT
643	MRC59	Middle Fork Crazy Woman Creek - Upper	9/29/1998	44.10677222	-106.99445278	GRANITIC MOUNTAINS	15	16.15843896	0.92830750	FULL SUPPORT
1587	SR41	MIDDLE FORK LITTLE LARAMIE RIVER - BELOW JIM CREEK	9/9/2005	41.29126111	-106.22332222	SOUTHERN ROCKIES	20	18.73422064	1.06756509	FULL SUPPORT
1035	SR33	Middle Fork Mill Creek - Above F.S. Road 397A	9/8/2000	41.39631400	-106.12429700	SOUTHERN ROCKIES	15	15.84238400	0.94682719	FULL SUPPORT
41	MRC8	Middle Fork Powder River	10/28/1993	43.60500000	-106.90111111	BIGHORN BASIN FOOTHILLS	10	12.99933729	0.76926998	INDETERMINATE
1298	WBO209	Middle Fork Powder River	9/26/2002	43.70716667	-106.63025556	NE PLAINS	8	8.92267120	0.89659249	FULL SUPPORT
1299	WBO208	Middle Fork Powder River	9/26/2002	43.65767778	-106.75494444	BIGHORN BASIN FOOTHILLS	7	8.91818887	0.78491273	INDETERMINATE
1934	WBO327	Middle Fork Powder River	9/17/2009	43.68528900	-106.69813300	BIGHORN BASIN FOOTHILLS	7	8.92141456	0.78462893	INDETERMINATE
1121	NGP143	Middle Fork Powder River above North Fork Powder	8/28/2000	43.70000000	-106.57000000	NE PLAINS	5	8.92333215	0.56032880	INDETERMINATE
904	NGP75	Middle Fork Powder River above South Fork	10/6/1999	43.67000000	-106.51337222	NE PLAINS	7	8.92583679	0.78424020	FULL SUPPORT
1120	NGP144	Middle Fork Powder River below North Fork Powder	8/28/2000	43.69000000	-106.55000000	NE PLAINS	7	8.92395371	0.78440568	FULL SUPPORT
132	MRW64	MIDDLE PINEY CREEK	10/1/1996	42.60833333	-110.48166667	SEDIMENTARY MOUNTAINS	11	9.42329034	1.16732050	FULL SUPPORT
325	MRW64	MIDDLE PINEY CREEK	9/18/1997	42.60833333	-110.48166667	SEDIMENTARY MOUNTAINS	10	8.91227258	1.12204827	FULL SUPPORT
312	MRW48	MIDDLE POPO AGIE RIVER - BRUCE'S BRIDGE	9/10/1997	42.72972222	-108.85888889	SEDIMENTARY MOUNTAINS	15	14.66205753	1.02304878	FULL SUPPORT
1723	MRW48	MIDDLE POPO AGIE RIVER - BRUCE'S BRIDGE	9/11/2007	42.72972222	-108.85888889	SEDIMENTARY MOUNTAINS	16	16.01602118	0.99899968	FULL SUPPORT
1733	MRW0161	Mill Creek Above South Fork	10/2/2007	42.20637777	-110.93964722	SEDIMENTARY MOUNTAINS	4	9.11389715	0.43889018	PARTIAL/NON SUPPORT
785	WB47	MILL CREEK - ABOVE CULVERT (BEAR RIVER)	9/22/1998	42.19163333	-110.90787222	HIGH VALLEYS	8	10.49888893	0.76198539	INDETERMINATE
1460	WB47	MILL CREEK - ABOVE CULVERT (BEAR RIVER)	9/28/2004	42.19163333	-110.90787222	HIGH VALLEYS	5	10.81810455	0.46218818	PARTIAL/NON SUPPORT
1725	WB47	MILL CREEK - ABOVE CULVERT (BEAR RIVER)	10/1/2007	42.19163333	-110.90787222	HIGH VALLEYS	5	10.86672589	0.46012019	PARTIAL/NON SUPPORT
1904	SR0061	MILL CREEK - RYAN PARK	8/13/2009	41.34385700	-106.46998540	SOUTHERN ROCKIES	16	18.74160855	0.85371541	INDETERMINATE
694	MRW85	MILL CREEK - State (BEAR RIVER)	10/22/1998	41.06551111	-110.89613889	HIGH VALLEYS	12	14.08397506	0.85203218	INDETERMINATE
332	WB15	MORGAN CREEK	10/1/1997	42.16111111	-106.92027778	SOUTHERN FOOTHILLS & LARAMIE RANGE	11	9.84902761	1.11686153	FULL SUPPORT
1210	WB15	MORGAN CREEK	10/30/2001	42.16111111	-106.92027778	SOUTHERN FOOTHILLS & LARAMIE RANGE	8	9.82625563	0.81414532	INDETERMINATE
1518	WBO238	Mormon Creek Eagle's Nest	6/29/2004	42.41956944	-108.45597778	WYOMING BASIN	7	9.62663617	0.72714912	INDETERMINATE

Appendix C (cont.) – WY RIVPACS O/E values and narrative ratings for 1993-2009 samples. Asterisks designate samples that were outside model experience.

SAMPLEID	STATIONID	WATERBODY NAME	COLLECTION DATE	LAT(N)	LONG(W)	2011 BIOREGION	O	E	OE	NARRATIVE RATING
137	MRW69	MORMON CREEK (ABOVE)	9/19/1996	44.47305556	-109.89638889	VOLCANIC MOUNTAINS & VALLEYS	16	13.29082586	1.20383791	FULL SUPPORT
288	MRW69	MORMON CREEK (ABOVE)	9/9/1997	44.47305556	-109.89638889	VOLCANIC MOUNTAINS & VALLEYS	15	13.28785706	1.12885019	FULL SUPPORT
1756	MRW69	MORMON CREEK (ABOVE)	9/4/2007	44.47305556	-109.89638889	VOLCANIC MOUNTAINS & VALLEYS	14	13.30573361	1.05217799	FULL SUPPORT
179	MRW14	MORMON CREEK (BELOW)	9/19/1996	44.47277778	-109.89888889	VOLCANIC MOUNTAINS & VALLEYS	15	13.27688979	1.12978267	FULL SUPPORT
287	MRW14	MORMON CREEK (BELOW)	9/9/1997	44.47277778	-109.89888889	VOLCANIC MOUNTAINS & VALLEYS	15	13.26795811	1.13054321	FULL SUPPORT
188	NGP2	MOYER SPRING	9/13/1995	44.37638889	-105.44527778	NE PLAINS	3	8.47567161	0.35395425	* PARTIAL/NON SUPPORT
1504	NGP2	MOYER SPRING	9/8/2004	44.37638889	-105.44527778	NE PLAINS	4	7.66964779	0.52153634	* INDETERMINATE
1656	NGP2	MOYER SPRING	9/1/2006	44.37638889	-105.44527778	NE PLAINS	5	8.52818251	0.58629139	* INDETERMINATE
1857	NGP2	MOYER SPRING	10/8/2008	44.37638889	-105.44527778	NE PLAINS	5	8.57248233	0.58326163	* INDETERMINATE
1215	WB154	Muddy Creek - blw 431 crossing	8/29/2001	43.28665556	-108.44958056	WYOMING BASIN	4	7.73587606	0.51707137	PARTIAL/NON SUPPORT
1214	WB153	Muddy Creek - Boysen	8/30/2001	43.28438056	-108.28534167	WYOMING BASIN	3	5.43254233	0.55222763	PARTIAL/NON SUPPORT
763	SR27	MUDDY CREEK - DELTA CLAIM	7/29/1998	41.12500278	-106.23720000	SOUTHERN ROCKIES	16	18.51820400	0.86401467	INDETERMINATE
55	MRCI30	MUDDY CREEK - LOWER	10/5/1993	44.13237222	-106.71058056	HIGH VALLEYS	6	13.95462531	0.42996497	PARTIAL/NON SUPPORT
669	MRCI30	MUDDY CREEK - LOWER	9/25/1998	44.13237222	-106.71058056	HIGH VALLEYS	7	13.99629622	0.50013231	PARTIAL/NON SUPPORT
1850	MRCI30	MUDDY CREEK - LOWER	9/23/2008	44.13237222	-106.71058056	HIGH VALLEYS	7	13.98861277	0.50040702	PARTIAL/NON SUPPORT
801	WB63	MUDDY CREEK - LOWER (GREEN RIVER)	9/30/1998	42.53967222	-110.07949444	HIGH VALLEYS	8	12.19723725	0.65588623	PARTIAL/NON SUPPORT
1412	WB63	MUDDY CREEK - LOWER (GREEN RIVER)	9/24/2003	42.53967222	-110.07949444	HIGH VALLEYS	3	11.70781439	0.25623912	PARTIAL/NON SUPPORT
51	MRCI29	MUDDY CREEK - MIDDLE	10/13/1993	44.16810833	-106.80583333	SOUTHERN ROCKIES	8	13.62776141	0.58703699	PARTIAL/NON SUPPORT
52	MRCI29	MUDDY CREEK - MIDDLE	9/27/1994	44.16810833	-106.80583333	SOUTHERN ROCKIES	12	13.71548903	0.87492323	INDETERMINATE
53	MRCI29	MUDDY CREEK - MIDDLE	9/28/1995	44.16810833	-106.80583333	SOUTHERN ROCKIES	8	13.65572785	0.58583476	PARTIAL/NON SUPPORT
54	MRCI29	MUDDY CREEK - MIDDLE	9/23/1996	44.16810833	-106.80583333	SOUTHERN ROCKIES	10	13.54140058	0.73847605	INDETERMINATE
326	MRCI29	MUDDY CREEK - MIDDLE	9/24/1997	44.16810833	-106.80583333	SOUTHERN ROCKIES	10	13.68321363	0.73082247	INDETERMINATE
668	MRCI29	MUDDY CREEK - MIDDLE	9/24/1998	44.16810833	-106.80583333	SOUTHERN ROCKIES	12	13.58500714	0.88332673	INDETERMINATE
838	MRCI29	MUDDY CREEK - MIDDLE	9/17/1999	44.16810833	-106.80583333	SOUTHERN ROCKIES	12	13.57635027	0.88388998	INDETERMINATE
1056	MRCI29	MUDDY CREEK - MIDDLE	9/6/2000	44.16810833	-106.80583333	SOUTHERN ROCKIES	6	13.57635027	0.44194499	PARTIAL/NON SUPPORT
1075	MRCI29	MUDDY CREEK - MIDDLE	9/13/2001	44.16810833	-106.80583333	SOUTHERN ROCKIES	8	13.59115109	0.58861828	PARTIAL/NON SUPPORT
1847	MRCI29	MUDDY CREEK - MIDDLE	9/17/2008	44.16810833	-106.80583333	SOUTHERN ROCKIES	9	13.59694727	0.66191328	INDETERMINATE
800	WB62	MUDDY CREEK - MIDDLE (GREEN RIVER)	9/30/1998	42.58702778	-110.07671111	HIGH VALLEYS	6	12.54801942	0.47816311	PARTIAL/NON SUPPORT
1342	WB62	MUDDY CREEK - MIDDLE (GREEN RIVER)	9/25/2003	42.58702778	-110.07671111	HIGH VALLEYS	5	12.56317496	0.39798857	PARTIAL/NON SUPPORT
50	MRCI28	MUDDY CREEK - UPPER	10/6/1993	44.15870000	-106.90964722	SEDIMENTARY MOUNTAINS	8	13.06589431	0.61228109	PARTIAL/NON SUPPORT
667	MRCI28	MUDDY CREEK - UPPER	9/16/1998	44.15870000	-106.90964722	SEDIMENTARY MOUNTAINS	10	15.45014670	0.64724305	PARTIAL/NON SUPPORT
1844	MRCI28	MUDDY CREEK - UPPER	9/15/2008	44.15870000	-106.90964722	SEDIMENTARY MOUNTAINS	10	15.59121811	0.64138670	PARTIAL/NON SUPPORT
799	WB61	MUDDY CREEK - UPPER (GREEN RIVER)	9/30/1998	42.73681667	-110.33405000	HIGH VALLEYS	6	11.59456602	0.51748379	PARTIAL/NON SUPPORT
1216	WB155	Muddy Creek - Wyoming Canal Crossing	8/29/2001	43.36153056	-108.60170556	WYOMING BASIN	3	8.07357445	0.37158263	PARTIAL/NON SUPPORT
144	MRW75	N.FK. SHOSHONE RIVER (SITE 1) (ABOVE)	9/20/1996	44.46111111	-109.66388889	VOLCANIC MOUNTAINS & VALLEYS	11	10.75043703	1.02321422	FULL SUPPORT
292	MRW75	N.FK. SHOSHONE RIVER (SITE 1) (ABOVE)	9/10/1997	44.46111111	-109.66388889	VOLCANIC MOUNTAINS & VALLEYS	11	10.75728948	1.02256242	FULL SUPPORT
149	MRW110	N.FK. SHOSHONE RIVER (SITE 1) (BELOW)	9/20/1996	44.46722222	-109.65916667	VOLCANIC MOUNTAINS & VALLEYS	9	10.75109969	0.83712367	INDETERMINATE
291	MRW110	N.FK. SHOSHONE RIVER (SITE 1) (BELOW)	9/10/1997	44.46722222	-109.65916667	VOLCANIC MOUNTAINS & VALLEYS	10	10.75791131	0.92954847	FULL SUPPORT
139	MRW70	N.FK. SHOSHONE RIVER (SITE 2) (ABOVE)	9/19/1996	44.50305556	-109.96055556	VOLCANIC MOUNTAINS & VALLEYS	11	10.73996598	1.02421181	FULL SUPPORT
294	MRW70	N.FK. SHOSHONE RIVER (SITE 2) (ABOVE)	9/9/1997	44.50305556	-109.96055556	VOLCANIC MOUNTAINS & VALLEYS	11	10.19104738	1.07937875	FULL SUPPORT
182	MRW15	N.FK. SHOSHONE RIVER (SITE 2) (BELOW)	9/19/1996	44.50000000	-109.95444444	VOLCANIC MOUNTAINS & VALLEYS	12	10.18945964	1.17768757	FULL SUPPORT
293	MRW15	N.FK. SHOSHONE RIVER (SITE 2) (BELOW)	9/9/1997	44.50000000	-109.95444444	VOLCANIC MOUNTAINS & VALLEYS	11	10.18945964	1.07954694	FULL SUPPORT
143	MRW74	N.FK. SHOSHONE RIVER (SITE 3) (ABOVE)	9/20/1996	44.45972222	-109.56694444	VOLCANIC MOUNTAINS & VALLEYS	11	10.67052419	1.03087719	FULL SUPPORT
296	MRW74	N.FK. SHOSHONE RIVER (SITE 3) (ABOVE)	9/10/1997	44.45972222	-109.56694444	VOLCANIC MOUNTAINS & VALLEYS	13	10.73996598	1.21043214	FULL SUPPORT
186	MRW19	N.FK. SHOSHONE RIVER (SITE 3) (BELOW)	9/20/1996	44.46055556	-109.55305556	VOLCANIC MOUNTAINS & VALLEYS	10	10.74261969	0.93087164	FULL SUPPORT
295	MRW19	N.FK. SHOSHONE RIVER (SITE 3) (BELOW)	9/10/1997	44.46055556	-109.55305556	VOLCANIC MOUNTAINS & VALLEYS	9	10.74261969	0.83778448	INDETERMINATE
793	WB55	NEW FORK - BELOW EAST FORK CONFLUENCE	9/30/1998	42.68228333	-109.74050833	HIGH VALLEYS	14	11.81666821	1.18476712	FULL SUPPORT
794	WB56	NEW FORK - ROSS BUTTE	9/30/1998	42.58597778	-109.91810833	HIGH VALLEYS	9	12.17494074	0.73922331	INDETERMINATE

Appendix C (cont.) – WY RIVPACS O/E values and narrative ratings for 1993-2009 samples. Asterisks designate samples that were outside model experience.

SAMPLEID	STATIONID	WATERBODY NAME	COLLECTION DATE	LAT(N)	LONG(W)	2011 BIOREGION	O	E	OE	NARRATIVE RATING
251	WB27	NEW FORK RIVER	9/30/1996	42.58444444	-109.92027778	HIGH VALLEYS	14	11.80738437	1.18569867	FULL SUPPORT
792	WB54	NEW FORK RIVER - AIRPORT	9/29/1998	42.78154722	-109.80220556	HIGH VALLEYS	15	12.10414040	1.23924537	FULL SUPPORT
252	WB28	NEW FORK RIVER - BULL PASTURE	10/2/1996	42.90770556	-109.92388889	HIGH VALLEYS	14	13.18791188	1.06157822	FULL SUPPORT
347	WB28	NEW FORK RIVER - BULL PASTURE	10/14/1997	42.90770556	-109.92388889	HIGH VALLEYS	6	9.93816502	0.60373318	PARTIAL/NON SUPPORT
766	WB28	NEW FORK RIVER - BULL PASTURE	10/1/1998	42.90770556	-109.92388889	HIGH VALLEYS	8	9.87901906	0.80979700	INDETERMINATE
928	WB28	NEW FORK RIVER - BULL PASTURE	10/5/1999	42.90770556	-109.92388889	HIGH VALLEYS	14	13.66016009	1.02487818	FULL SUPPORT
1054	WB28	NEW FORK RIVER - BULL PASTURE	9/26/2000	42.90770556	-109.92388889	HIGH VALLEYS	9	9.87590066	0.91130929	FULL SUPPORT
1228	WB28	NEW FORK RIVER - BULL PASTURE	10/3/2001	42.90770556	-109.92388889	HIGH VALLEYS	5	9.29040167	0.53818986	PARTIAL/NON SUPPORT
1229	WB28	NEW FORK RIVER - BULL PASTURE	9/26/2000	42.90770556	-109.92388889	HIGH VALLEYS	9	10.04227343	0.89621141	FULL SUPPORT
1330	WB28	NEW FORK RIVER - BULL PASTURE	9/25/2002	42.90770556	-109.92388889	HIGH VALLEYS	6	9.81964530	0.61102003	PARTIAL/NON SUPPORT
1344	WB28	NEW FORK RIVER - BULL PASTURE	10/1/2003	42.90770556	-109.92388889	HIGH VALLEYS	5	9.83863018	0.50820083	PARTIAL/NON SUPPORT
1873	WB28	NEW FORK RIVER - BULL PASTURE	10/6/2008	42.90770556	-109.92388889	HIGH VALLEYS	4	9.87394916	0.40510640	PARTIAL/NON SUPPORT
131	MRW63	NEW FORK RIVER - UPPER	10/2/1996	43.07833333	-109.99527778	HIGH VALLEYS	10	15.52985932	0.64392084	PARTIAL/NON SUPPORT
963	WHP23	NORTH BEAR CREEK - LOWER CANTLER (NBC1)	10/21/1999	41.62488333	-104.77940833	SE PLAINS	11	8.92846481	1.23201471	FULL SUPPORT
645	MRC60	North Clear Creek - Above Hunter Creek	9/18/1998	44.32090833	-106.95058611	GRANITIC MOUNTAINS	17	15.44083062	1.10097704	FULL SUPPORT
646	MRC61	North Clear Creek - Below Hunter Creek	9/18/1998	44.32104722	-106.95060278	GRANITIC MOUNTAINS	19	15.54589200	1.22218783	FULL SUPPORT
1048	MRC61	North Clear Creek - Below Hunter Creek	9/28/2000	44.32104722	-106.95060278	GRANITIC MOUNTAINS	16	16.77205731	0.95396764	FULL SUPPORT
1755	MRC0115	North Clear Creek Lucasta Camp	8/30/2007	44.32006700	-106.89985000	GRANITIC MOUNTAINS	15	12.75874194	1.17566450	FULL SUPPORT
227	SR20	NORTH FORK BIG CREEK - QUIMBY PARK	9/4/1996	41.04666667	-106.59805556	SOUTHERN FOOTHILLS & LARAMIE RANGE	15	17.50738540	0.85678128	INDETERMINATE
1685	SR20	NORTH FORK BIG CREEK - QUIMBY PARK	9/6/2006	41.04680162	-106.59882590	SOUTHERN FOOTHILLS & LARAMIE RANGE	14	17.87864961	0.78305690	INDETERMINATE
730	NGP43	North Fork Crazy Woman Creek - Below Muddy Creek	9/25/1998	44.12371944	-106.69895833	HIGH VALLEYS	10	8.95203557	1.11706437	FULL SUPPORT
1398	NGP43	North Fork Crazy Woman Creek - Below Muddy Creek	9/23/2003	44.12371944	-106.69895833	HIGH VALLEYS	6	12.10337745	0.49572940	PARTIAL/NON SUPPORT
1852	NGP43	North Fork Crazy Woman Creek - Below Muddy Creek	9/24/2008	44.12371944	-106.69895833	HIGH VALLEYS	6	11.96911859	0.50129005	PARTIAL/NON SUPPORT
57	MRCI32	NORTH FORK CRAZY WOMAN CREEK - LOWER	10/13/1993	44.17159167	-106.69842222	SOUTHERN ROCKIES	7	13.62670005	0.51369737	PARTIAL/NON SUPPORT
671	MRCI32	NORTH FORK CRAZY WOMAN CREEK - LOWER	9/25/1998	44.17159167	-106.69842222	SOUTHERN ROCKIES	8	12.95810698	0.61737413	PARTIAL/NON SUPPORT
1387	MRCI32	NORTH FORK CRAZY WOMAN CREEK - LOWER	9/25/2003	44.17159167	-106.69842222	SOUTHERN ROCKIES	6	12.93429596	0.46388300	PARTIAL/NON SUPPORT
1848	MRCI32	NORTH FORK CRAZY WOMAN CREEK - LOWER	9/18/2008	44.17159167	-106.69842222	SOUTHERN ROCKIES	6	13.61204640	0.44078604	PARTIAL/NON SUPPORT
56	MRCI31	NORTH FORK CRAZY WOMAN CREEK - MIDDLE	10/13/1993	44.19673056	-106.76899444	SOUTHERN ROCKIES	14	14.15755980	0.98887098	FULL SUPPORT
670	MRCI31	NORTH FORK CRAZY WOMAN CREEK - MIDDLE	9/24/1998	44.19673056	-106.76899444	SOUTHERN ROCKIES	14	13.44900177	1.04096945	FULL SUPPORT
1399	MRCI31	NORTH FORK CRAZY WOMAN CREEK - MIDDLE	9/25/2003	44.19673056	-106.76899444	SOUTHERN ROCKIES	13	14.07531112	0.92360303	FULL SUPPORT
1845	MRCI31	NORTH FORK CRAZY WOMAN CREEK - MIDDLE	9/16/2008	44.19673056	-106.76899444	SOUTHERN ROCKIES	12	14.18295662	0.84608593	INDETERMINATE
710	NGP23	North Fork Crazy Woman Creek - Middle Fork Road	9/28/1998	44.08656389	-106.67151111	HIGH VALLEYS	8	12.76131196	0.62689479	PARTIAL/NON SUPPORT
1397	NGP23	North Fork Crazy Woman Creek - Middle Fork Road	9/23/2003	44.08656389	-106.67151111	HIGH VALLEYS	7	9.09843493	0.76936309	INDETERMINATE
1853	NGP23	North Fork Crazy Woman Creek - Middle Fork Road	9/25/2008	44.08656389	-106.67151111	HIGH VALLEYS	8	10.33448612	0.77410719	INDETERMINATE
648	MRC63	North Fork Crazy Woman Creek - Pole Creek Road	9/17/1998	44.15616944	-106.97225833	GRANITIC MOUNTAINS	18	15.54372860	1.15802331	FULL SUPPORT
1842	MRC63	North Fork Crazy Woman Creek - Pole Creek Road	9/10/2008	44.15619200	-106.97227500	GRANITIC MOUNTAINS	20	17.88598305	1.11819406	FULL SUPPORT
23	MRC26	NORTH FORK CRAZY WOMAN CREEK - UPPER	10/6/1993	44.16877500	-106.91521667	GRANITIC MOUNTAINS	15	15.17008379	0.98878821	FULL SUPPORT
24	MRC26	NORTH FORK CRAZY WOMAN CREEK - UPPER	9/28/1994	44.16877500	-106.91521667	GRANITIC MOUNTAINS	16	15.59258508	1.02612876	FULL SUPPORT
25	MRC26	NORTH FORK CRAZY WOMAN CREEK - UPPER	9/26/1995	44.16877500	-106.91521667	GRANITIC MOUNTAINS	17	15.17008379	1.12062664	FULL SUPPORT
26	MRC26	NORTH FORK CRAZY WOMAN CREEK - UPPER	9/24/1996	44.16877500	-106.91521667	GRANITIC MOUNTAINS	16	15.53953208	1.02963203	FULL SUPPORT
327	MRC26	NORTH FORK CRAZY WOMAN CREEK - UPPER	9/25/1997	44.16877500	-106.91521667	GRANITIC MOUNTAINS	16	15.53953208	1.02963203	FULL SUPPORT
620	MRC26	NORTH FORK CRAZY WOMAN CREEK - UPPER	9/17/1998	44.16877500	-106.91521667	GRANITIC MOUNTAINS	19	15.49584727	1.22613496	FULL SUPPORT
830	MRC26	NORTH FORK CRAZY WOMAN CREEK - UPPER	9/16/1999	44.16877500	-106.91521667	GRANITIC MOUNTAINS	16	15.17008379	1.05470742	FULL SUPPORT
1072	MRC26	NORTH FORK CRAZY WOMAN CREEK - UPPER	9/10/2001	44.16877500	-106.91521667	GRANITIC MOUNTAINS	20	17.07376756	1.17138762	FULL SUPPORT
1074	MRC26	NORTH FORK CRAZY WOMAN CREEK - UPPER	9/7/2000	44.16877500	-106.91521667	GRANITIC MOUNTAINS	19	15.53680288	1.22290282	FULL SUPPORT
1286	MRC26	NORTH FORK CRAZY WOMAN CREEK - UPPER	9/4/2002	44.16877500	-106.91521667	GRANITIC MOUNTAINS	17	17.08649952	0.99493755	FULL SUPPORT
1843	MRC26	NORTH FORK CRAZY WOMAN CREEK - UPPER	9/11/2008	44.16877500	-106.91521667	GRANITIC MOUNTAINS	16	15.53680288	1.02981290	FULL SUPPORT
233	SR4	NORTH FORK ENCAMPMENT RIVER - LOWER	8/28/1996	41.15972222	-106.89055556	SOUTHERN FOOTHILLS & LARAMIE RANGE	19	14.16377833	1.34144997	FULL SUPPORT

Assessment of Aquatic Biological Condition Using WY RIVPACS with Comparisons to the Wyoming Stream Integrity Index (WSII)

Appendix C (cont.) – WY RIVPACS O/E values and narrative ratings for 1993-2009 samples. Asterisks designate samples that were outside model experience.

SAMPLEID	STATIONID	WATERBODY NAME	COLLECTION DATE	LAT(N)	LONG(W)	2011 BIOREGION	O	E	OE	NARRATIVE RATING
236	SR7	NORTH FORK ENCAMPMENT RIVER - UPPER	8/28/1996	41.15944444	-106.89222222	SOUTHERN FOOTHILLS & LARAMIE RANGE	18	14.16777696	1.27048866	FULL SUPPORT
226	SR2	NORTH FORK LITTLE LARAMIE RIVER - CORNER MOUNTAIN	9/12/1996	41.32916667	-106.16138889	SOUTHERN FOOTHILLS & LARAMIE RANGE	17	18.44978925	0.92141974	FULL SUPPORT
1914	SR2	NORTH FORK LITTLE LARAMIE RIVER - CORNER MOUNTAIN	9/16/2009	41.32916667	-106.16138889	SOUTHERN FOOTHILLS & LARAMIE RANGE	10	9.99175656	1.00082502	FULL SUPPORT
1773	SR0054	NORTH FORK LITTLE MEDICINE BOW RIVER - FALLS	7/24/2007	42.44216100	-106.01229400	SOUTHERN FOOTHILLS & LARAMIE RANGE	13	10.28568872	1.26389203	FULL SUPPORT
224	SR16	NORTH FORK LITTLE SNAKE RIVER	8/23/1996	41.01541667	-107.02159167	SOUTHERN FOOTHILLS & LARAMIE RANGE	19	18.22303932	1.04263617	FULL SUPPORT
310	SR16	NORTH FORK LITTLE SNAKE RIVER	9/9/1997	41.01541667	-107.02159167	SOUTHERN FOOTHILLS & LARAMIE RANGE	18	17.96252224	1.00208644	FULL SUPPORT
762	SR16	NORTH FORK LITTLE SNAKE RIVER	9/17/1998	41.01541667	-107.02159167	SOUTHERN FOOTHILLS & LARAMIE RANGE	18	17.96252224	1.00208644	FULL SUPPORT
921	SR16	NORTH FORK LITTLE SNAKE RIVER	9/16/1999	41.01541667	-107.02159167	SOUTHERN FOOTHILLS & LARAMIE RANGE	19	15.20981232	1.24919359	FULL SUPPORT
387	MRW46	NORTH FORK POPO AGIE RIVER - PUBLIC FISHING ACCESS	10/22/1997	42.88000000	-108.72694444	HIGH VALLEYS	14	11.97519896	1.16908287	FULL SUPPORT
206	NGPI27	NORTH FORK POWDER RIVER - ABOVE	10/9/1995	43.76722222	-106.60972222	NE PLAINS	8	8.92136649	0.89672361	FULL SUPPORT
207	NGPI28	NORTH FORK POWDER RIVER - BELOW	10/9/1995	43.76666667	-106.60972222	NE PLAINS	6	8.92088251	0.67257920	INDETERMINATE
317	MRCI35	NORTH FORK POWDER RIVER - CROSSING	9/12/1997	44.10694444	-107.09000000	GRANITIC MOUNTAINS	16	15.60907583	1.02504467	FULL SUPPORT
40	MRC7	NORTH FORK POWDER RIVER - LOWER	9/29/1994	44.03083333	-107.09444444	GRANITIC MOUNTAINS	19	15.48154911	1.22726737	FULL SUPPORT
35	MRC35	NORTH FORK POWDER RIVER - UPPER	9/29/1994	44.03416667	-107.09444444	GRANITIC MOUNTAINS	17	15.60282563	1.08954624	FULL SUPPORT
1061	NGP134	North Fork Powder River above Middle Fork Powder R	8/28/2000	43.70416400	-106.55477800	NE PLAINS	9	8.92366989	1.00855367	FULL SUPPORT
1063	NGP133	North Fork Powder River above OT Canal	8/30/2000	43.76223056	-106.60004722	NE PLAINS	8	8.92162122	0.89669801	FULL SUPPORT
1062	NGP132	North Fork Powder River below OT Canal	8/30/2000	43.76151667	-106.59408611	NE PLAINS	7	8.92176618	0.78459801	FULL SUPPORT
649	MRC64	North Fork Rock Creek - Upper	10/19/1998	44.46629167	-106.90634722	SOUTHERN ROCKIES	18	15.46414340	1.16398300	FULL SUPPORT
373	NGPI35	NORTH FORK SHELL CREEK	9/24/1997	44.48929167	-106.80926389	HIGH VALLEYS	10	9.48322776	1.05449329	FULL SUPPORT
742	NGPI35	NORTH FORK SHELL CREEK	10/21/1998	44.48929167	-106.80926389	HIGH VALLEYS	7	9.40442513	0.74433045	INDETERMINATE
122	MRW51	NORTH FORK SHOSHONE RIVER - SCOUT CAMP	9/3/1993	44.45750000	-109.86277778	VOLCANIC MOUNTAINS & VALLEYS	11	11.27789966	0.97535892	FULL SUPPORT
178	MRWI39	NORTH FORK SMITHS FORK RIVER	10/4/1995	42.48722222	-110.83583333	SEDIMENTARY MOUNTAINS	11	9.18357206	1.19779100	FULL SUPPORT
1618	MRWI39	NORTH FORK SMITHS FORK RIVER	10/17/2005	42.48722222	-110.83583333	SEDIMENTARY MOUNTAINS	8	9.10821372	0.87832809	FULL SUPPORT
1866	MRWI39	NORTH FORK SMITHS FORK RIVER	10/14/2008	42.48722222	-110.83583333	SEDIMENTARY MOUNTAINS	7	9.10251142	0.76901854	INDETERMINATE
161	MRWI22	NORTH FORK SPREAD CREEK - LOWER	8/30/1994	43.77750000	-110.25527778	SEDIMENTARY MOUNTAINS	8	9.31946887	0.85841802	FULL SUPPORT
162	MRWI22	NORTH FORK SPREAD CREEK - LOWER	9/4/1996	43.77750000	-110.25527778	SEDIMENTARY MOUNTAINS	9	9.32990923	0.96463961	FULL SUPPORT
1409	MRWI22	NORTH FORK SPREAD CREEK - LOWER	9/9/2003	43.77750000	-110.25527778	SEDIMENTARY MOUNTAINS	9	9.32541268	0.96510474	FULL SUPPORT
159	MRWI21	NORTH FORK SPREAD CREEK - MIDDLE	8/30/1994	43.77722222	-110.24972222	SEDIMENTARY MOUNTAINS	7	9.34303105	0.74922153	INDETERMINATE
160	MRWI21	NORTH FORK SPREAD CREEK - MIDDLE	9/4/1996	43.77722222	-110.24972222	SEDIMENTARY MOUNTAINS	9	9.35780497	0.96176401	FULL SUPPORT
1410	MRWI21	NORTH FORK SPREAD CREEK - MIDDLE	9/9/2003	43.77722222	-110.24972222	SEDIMENTARY MOUNTAINS	10	9.35631151	1.06879725	FULL SUPPORT
157	MRWI20	NORTH FORK SPREAD CREEK - UPPER	8/31/1994	43.77611111	-110.24250000	SEDIMENTARY MOUNTAINS	10	9.39348618	1.06456749	FULL SUPPORT
158	MRWI20	NORTH FORK SPREAD CREEK - UPPER	9/4/1996	43.77611111	-110.24250000	SEDIMENTARY MOUNTAINS	11	9.91058395	1.10992451	FULL SUPPORT
1411	MRWI20	NORTH FORK SPREAD CREEK - UPPER	9/10/2003	43.77611111	-110.24250000	SEDIMENTARY MOUNTAINS	11	9.39199134	1.17121062	FULL SUPPORT
380	MRE5	NORTH FORK SUNDANCE CREEK	10/22/1997	44.40638889	-104.38805556	BLACK HILLS	3	8.06590110	0.37193613	PARTIAL/NON SUPPORT
1408	WB204	North Fork Vermillion Creek Road Crossing	8/26/2003	41.10753333	-108.87162778	WYOMING BASIN	7	9.88087793	0.70843907	INDETERMINATE
808	WB71	NORTH FORK VERMILLION CREEK - LOWER	8/27/1998	41.09373333	-108.79495556	WYOMING BASIN	5	6.78926651	0.73645658	INDETERMINATE
807	WB70	NORTH FORK VERMILLION CREEK - Pine Mountain	8/27/1998	41.10039167	-108.91217222	WYOMING BASIN	8	11.02268955	0.72577568	INDETERMINATE
1407	WB70	NORTH FORK VERMILLION CREEK - Pine Mountain	8/26/2003	41.10039167	-108.91217222	WYOMING BASIN	7	11.03966475	0.63407723	PARTIAL/NON SUPPORT
1269	MRW0128	North Horse Creek Mule	10/24/2002	42.93453611	-110.53099722	SEDIMENTARY MOUNTAINS	10	9.01219922	1.10960707	FULL SUPPORT
1187	MRW121	North Horse Creek- Merna Butte	9/26/2001	42.94662778	-110.39610556	SEDIMENTARY MOUNTAINS	9	8.95077405	1.00549963	FULL SUPPORT
1910	SR0063	NORTH LARAMIE RIVER - MENTOR KNOB	9/3/2009	42.16360900	-105.47983050	WYOMING BASIN	8	8.86418179	0.90250857	FULL SUPPORT
1590	SR42	NORTH LARAMIE RIVER - TOLTEC	9/29/2005	42.29601111	-105.67911944	SOUTHERN FOOTHILLS & LARAMIE RANGE	6	9.49789167	0.63171914	PARTIAL/NON SUPPORT
376	MRC34	NORTH OTTER CREEK	9/5/1997	43.86277778	-107.29694444	BIGHORN BASIN FOOTHILLS	12	13.64837542	0.87922552	FULL SUPPORT
1573	MRC34	NORTH OTTER CREEK	8/23/2005	43.86277778	-107.29694444	BIGHORN BASIN FOOTHILLS	10	13.17156947	0.75921097	INDETERMINATE
128	MRW6	NORTH PINEY CREEK #1	10/1/1996	42.66166667	-110.49055556	SEDIMENTARY MOUNTAINS	10	9.45071874	1.05812058	FULL SUPPORT
93	MRW16	NORTH PINEY CREEK #2	10/1/1996	42.66138889	-110.49000000	SEDIMENTARY MOUNTAINS	6	9.45319179	0.63470626	PARTIAL/NON SUPPORT
1252	WHP35	NORTH PLATTE RIVER - ABOVE RAWHIDE CREEK	8/28/2002	42.10357500	-104.34565278	SE PLAINS	5	8.92835113	0.56001382	* INDETERMINATE
361	WB29	NORTH PLATTE RIVER - ABOVE SAGE CREEK	10/20/1997	41.58888889	-106.95944444	WYOMING BASIN	11	11.82237358	0.93043922	FULL SUPPORT

Appendix C (cont.) – WY RIVPACS O/E values and narrative ratings for 1993-2009 samples. Asterisks designate samples that were outside model experience.

SAMPLEID	STATIONID	WATERBODY NAME	COLLECTION DATE	LAT(N)	LONG(W)	2011 BIOREGION	O	E	OE	NARRATIVE RATING
1251	WHP34	NORTH PLATTE RIVER - ABOVE TORRINGTON WWTF	8/27/2002	42.0453889	-104.16704722	SE PLAINS	6	8.92843855	0.67201000	* INDETERMINATE
1477	NGP193	NORTH PLATTE RIVER - ANDERSON DAIRY	10/7/2004	42.71847778	-105.38714722	NE PLAINS	7	8.92347309	0.78444793	* FULL SUPPORT
1259	WB176	NORTH PLATTE RIVER - BELOW BATES CREEK	10/22/2002	42.69529167	-106.61235278	WYOMING BASIN	6	8.80486599	0.68144138	INDETERMINATE
1258	NGP151	NORTH PLATTE RIVER - BELOW GLENDON DAM	10/9/2002	42.46061667	-104.94994722	NE PLAINS	6	8.92735416	0.67209163	* INDETERMINATE
1250	WHP33	NORTH PLATTE RIVER - BELOW TORRINGTON WWTF	8/26/2002	42.04541389	-104.16292500	SE PLAINS	6	8.92846509	0.67200800	* INDETERMINATE
1697	NGP202	NORTH PLATTE RIVER - BROOKHURST	10/11/2006	42.85438446	-106.20200516	NE PLAINS	9	8.87909598	1.01361670	FULL SUPPORT
1257	NGP150	NORTH PLATTE RIVER - CASSA	10/9/2002	42.41147778	-104.93771111	NE PLAINS	8	8.92762963	0.89609452	* FULL SUPPORT
231	SR24	NORTH PLATTE RIVER - CORRAL CREEK	8/29/1996	41.25944444	-106.57361111	WYOMING BASIN	12	12.31552206	0.97438013	FULL SUPPORT
1274	WB174	NORTH PLATTE RIVER - FORT STEELE CANYON	9/18/2002	41.86278611	-107.05575278	WYOMING BASIN	10	8.14696087	1.22745158	FULL SUPPORT
1255	WB181	NORTH PLATTE RIVER - FREMONT CANYON	9/24/2002	42.46833333	-106.85333333	WYOMING BASIN	4	8.18017408	0.48898715	PARTIAL/NON SUPPORT
1249	WHP32	NORTH PLATTE RIVER - HUNTON MEADOWS	8/23/2002	42.00436944	-104.08995000	SE PLAINS	5	8.92847484	0.56000606	* INDETERMINATE
1275	WB175	NORTH PLATTE RIVER - MIRACLE MILE	9/18/2002	42.21429722	-106.87872500	WYOMING BASIN	9	8.17607562	1.10077260	FULL SUPPORT
348	SR12	NORTH PLATTE RIVER - PIKE POLE	10/14/1997	41.14000000	-106.44583333	WYOMING BASIN	12	12.80780621	0.93692860	FULL SUPPORT
1744	SR12	NORTH PLATTE RIVER - PIKE POLE	9/27/2007	41.13967060	-106.44653360	WYOMING BASIN	12	12.80122923	0.93740998	FULL SUPPORT
1698	WHP43	NORTH PLATTE RIVER - ROCK RANCH	10/17/2006	42.08579498	-104.28132776	SE PLAINS	6	8.92838341	0.67201415	* INDETERMINATE
399	WB121	NORTH PLATTE RIVER - SAVAGE MEADOWS	10/20/1997	41.68638889	-106.89166667	WYOMING BASIN	5	6.19318736	0.80733873	INDETERMINATE
1465	WB220	NORTH PLATTE RIVER - THE OLD BOB PLACE	7/29/2004	41.63847778	-106.94018611	WYOMING BASIN	10	11.82277050	0.84582543	FULL SUPPORT
397	WB5	NORTH PLATTE RIVER - TREASURE ISLAND	10/14/1997	41.33222222	-106.72694444	WYOMING BASIN	10	11.82287898	0.84581767	FULL SUPPORT
1278	WHP36	NORTH PLATTE RIVER - WENDOVER	10/8/2002	42.34505833	-104.86490000	SE PLAINS	5	8.92755809	0.56006356	* INDETERMINATE
371	NGPI33	NORTH PRONG SHELL CREEK	9/24/1997	44.50255278	-106.79099444	HIGH VALLEYS	7	9.46539073	0.73953630	INDETERMINATE
741	NGPI33	NORTH PRONG SHELL CREEK	10/21/1998	44.50255278	-106.79099444	HIGH VALLEYS	7	9.57506326	0.73106567	INDETERMINATE
82	MREI4	NORTH REDWATER CREEK	10/18/1995	44.58222222	-104.29777778	BLACK HILLS	7	9.19359422	0.76139971	INDETERMINATE
1588	WB228	NORTH SPRING CREEK - RICH PLACE	9/14/2005	41.38983000	-106.85689000	WYOMING BASIN	9	10.40994126	0.86455819	FULL SUPPORT
351	SRI1	NORTH SYBILLE CREEK	10/15/1997	41.74611111	-105.41055556	SE PLAINS	8	7.30787846	1.09470896	FULL SUPPORT
375	MRC22	NORTH TONGUE RIVER - HIDEOUT	9/18/1997	44.75550278	-107.63309444	SEDIMENTARY MOUNTAINS	10	13.55242835	0.73787514	INDETERMINATE
617	MRC22	NORTH TONGUE RIVER - HIDEOUT	9/10/1998	44.75550278	-107.63309444	SEDIMENTARY MOUNTAINS	11	13.03266150	0.84403328	FULL SUPPORT
1419	MRC22	NORTH TONGUE RIVER - HIDEOUT	9/4/2003	44.75550278	-107.63309444	SEDIMENTARY MOUNTAINS	11	13.03087711	0.84414886	FULL SUPPORT
1928	MRC22	NORTH TONGUE RIVER - HIDEOUT	9/3/2009	44.75550278	-107.63309444	SEDIMENTARY MOUNTAINS	9	13.02893520	0.69077019	INDETERMINATE
650	MRC65	North Tongue River - Highway 14A Crossing	9/10/1998	44.75953333	-107.62000000	SEDIMENTARY MOUNTAINS	12	12.98674311	0.92401920	FULL SUPPORT
1272	MRC65	North Tongue River - Highway 14A Crossing	7/10/2002	44.75953333	-107.62000000	SEDIMENTARY MOUNTAINS	10	13.00532120	0.76891603	INDETERMINATE
1395	MRC65	North Tongue River - Highway 14A Crossing	9/4/2003	44.75953333	-107.62000000	SEDIMENTARY MOUNTAINS	13	13.00532120	0.99959084	FULL SUPPORT
4	MRC12	NORTH TONGUE RIVER - LOWER	9/15/1993	44.78192222	-107.53440278	SEDIMENTARY MOUNTAINS	10	12.63246593	0.79161108	INDETERMINATE
615	MRC12	NORTH TONGUE RIVER - LOWER	9/10/1998	44.78192222	-107.53440278	SEDIMENTARY MOUNTAINS	11	12.61737325	0.87181379	FULL SUPPORT
1384	MRC12	NORTH TONGUE RIVER - LOWER	9/3/2003	44.78192222	-107.53440278	SEDIMENTARY MOUNTAINS	11	12.62943545	0.87098113	FULL SUPPORT
3	MRC11	NORTH TONGUE RIVER - UPPER	9/14/1993	44.74600833	-107.69480833	SEDIMENTARY MOUNTAINS	8	13.66613143	0.58538878	PARTIAL/NON SUPPORT
614	MRC11	NORTH TONGUE RIVER - UPPER	9/10/1998	44.74600833	-107.69480833	SEDIMENTARY MOUNTAINS	11	13.65743821	0.80542191	INDETERMINATE
1364	MRC11	NORTH TONGUE RIVER - UPPER	9/4/2003	44.74600833	-107.69480833	SEDIMENTARY MOUNTAINS	8	13.65203803	0.58599309	PARTIAL/NON SUPPORT
1927	MRC11	NORTH TONGUE RIVER - UPPER	9/1/2009	44.74600833	-107.69480833	SEDIMENTARY MOUNTAINS	10	13.66460923	0.73181749	INDETERMINATE
1654	WBO260	Nowood River	10/16/2006	43.60568730	-107.41345160	WYOMING BASIN	9	8.63981474	1.04168900	FULL SUPPORT
1655	WBO261	Nowood River	10/17/2006	43.80753510	-107.34394690	BIGHORN BASIN FOOTHILLS	6	13.27621496	0.45193604	PARTIAL/NON SUPPORT
1662	WBO259	Nowood River	10/18/2006	43.65000000	-107.37000000	WYOMING BASIN	6	8.70099801	0.68957607	INDETERMINATE
1201	WB118	Nowood River Bel. Buffalo Ck.	10/5/2000	44.12394444	-107.55057222	WYOMING BASIN	9	7.90157745	1.13901307	FULL SUPPORT
1657	WB118	Nowood River Bel. Buffalo Ck.	10/9/2006	44.12394444	-107.55057222	WYOMING BASIN	9	8.61871152	1.04423962	FULL SUPPORT
1199	WB116	Nowood River Bluff	10/4/2000	44.21079444	-107.73751667	WYOMING BASIN	6	7.04941712	0.85113420	FULL SUPPORT
1659	WB116	Nowood River Bluff	10/10/2006	44.21079444	-107.73751667	WYOMING BASIN	5	7.20135888	0.69431340	INDETERMINATE
1200	WB117	Nowood River Manderson	10/4/2000	44.26450278	-107.94917222	WYOMING BASIN	4	11.72210084	0.34123576	PARTIAL/NON SUPPORT
1658	WB117	Nowood River Manderson	10/10/2006	44.26450278	-107.94917222	WYOMING BASIN	6	11.72415136	0.51176412	PARTIAL/NON SUPPORT
108	MRW37	OBSDIAN CREEK	9/15/1994	44.87944444	-110.73666667	VOLCANIC MOUNTAINS & VALLEYS	5	10.53038414	0.47481649	PARTIAL/NON SUPPORT

Appendix C (cont.) – WY RIVPACS O/E values and narrative ratings for 1993-2009 samples. Asterisks designate samples that were outside model experience.

SAMPLEID	STATIONID	WATERBODY NAME	COLLECTION DATE	LAT(N)	LONG(W)	2011 BIOREGION	O	E	OE	NARRATIVE RATING
1360	MRC0101	Oliver Creek	8/4/2003	44.27187778	-107.01304722	GRANITIC MOUNTAINS	18	17.08251190	1.05370920	FULL SUPPORT
302	MRW126	OLIVER GULCH CREEK	8/27/1997	44.84361111	-109.62555556	SEDIMENTARY MOUNTAINS	6	14.37161555	0.41748960	PARTIAL/NON SUPPORT
34	MRC33	OTTER CREEK	10/21/1993	43.86444444	-107.30972222	BIGHORN BASIN Foothills	10	12.99717239	0.76939812	INDETERMINATE
1522	WB0231	Owl Creek Highway 120	7/7/2004	43.68658056	-108.30465556	WYOMING BASIN	3	5.99070139	0.50077609	PARTIAL/NON SUPPORT
1523	WB0232	Owl Creek Jones Road	7/6/2004	43.69004167	-108.37475556	WYOMING BASIN	1	6.53792042	0.15295383	PARTIAL/NON SUPPORT
1213	WB152	Owl Creek - Hwy 20 crossing	8/22/2001	43.71579444	-108.17859722	WYOMING BASIN	3	13.84780580	0.21664082	PARTIAL/NON SUPPORT
1521	WB152	Owl Creek - Hwy 20 crossing	7/7/2004	43.71579444	-108.17859722	WYOMING BASIN	2	13.81617240	0.14475789	PARTIAL/NON SUPPORT
1264	MRW0132	Pacific Creek Gaging Station	8/8/2002	43.85511111	-110.50606111	SEDIMENTARY MOUNTAINS	8	10.61984059	0.75330698	INDETERMINATE
1314	MRW0130	Pacific Creek Gravel	8/7/2002	43.95189167	-110.41384444	SEDIMENTARY MOUNTAINS	9	9.14121266	0.98455209	FULL SUPPORT
1881	MRW0130	Pacific Creek Gravel	7/27/2009	43.95189167	-110.41384444	SEDIMENTARY MOUNTAINS	9	9.14881090	0.98373440	FULL SUPPORT
1263	MRW0131	Pacific Creek Park Boundary	8/7/2002	43.91751111	-110.46506389	SEDIMENTARY MOUNTAINS	8	9.62103066	0.83151175	FULL SUPPORT
1455	MRW0142	Pacific Creek Davis Hill	8/10/2004	43.88087500	-110.45776389	SEDIMENTARY MOUNTAINS	10	10.12727765	0.98743220	FULL SUPPORT
14	MRC21	PAINTROCK CREEK	9/28/1993	44.28833333	-107.48583333	BIGHORN BASIN Foothills	12	13.00348383	0.92282962	FULL SUPPORT
1483	MRC21	PAINTROCK CREEK	9/16/2004	44.28833333	-107.48583333	BIGHORN BASIN Foothills	11	13.34497324	0.82428041	INDETERMINATE
1287	MRC0106	Pass Creek	9/9/2002	43.94849722	-107.05100000	SEDIMENTARY MOUNTAINS	9	13.81942482	0.65125721	PARTIAL/NON SUPPORT
368	MRW62	PEBBLE CREEK	8/26/1997	44.91777778	-110.11055556	VOLCANIC MOUNTAINS & VALLEYS	8	10.05049841	0.79598043	INDETERMINATE
1648	MRW62	PEBBLE CREEK	9/26/2006	44.91777778	-110.11055556	VOLCANIC MOUNTAINS & VALLEYS	13	10.06892107	1.29110159	FULL SUPPORT
1683	WB254	PETE CREEK - BELOW WEST BRANCH	8/3/2006	42.34374705	-107.26121265	WYOMING BASIN	7	5.56507794	1.25784402	FULL SUPPORT
304	MRW33	PICKETT CREEK	8/29/1997	44.16722222	-109.28638889	BIGHORN BASIN Foothills	8	9.31842229	0.85851443	FULL SUPPORT
1194	MRW97	Pine Creek Above Highway 28	8/17/2000	42.45132500	-108.86040000	WYOMING BASIN	2	8.73052941	0.22908118	PARTIAL/NON SUPPORT
1520	MRW97	Pine Creek Above Highway 28	7/1/2004	42.45132500	-108.86040000	WYOMING BASIN	8	14.26188887	0.56093552	PARTIAL/NON SUPPORT
1453	WB0241	Pine Creek Confluence	7/1/2004	42.38172778	-108.75906667	WYOMING BASIN	5	9.15242269	0.54630344	PARTIAL/NON SUPPORT
324	MRW78	PINE GROVE CREEK	9/18/1997	42.43305556	-110.37555556	WYOMING BASIN	2	8.01331136	0.24958471	PARTIAL/NON SUPPORT
891	NGP62	Piney Creek - Clear Creek Confluence	10/29/1999	44.56386111	-106.52603611	HIGH VALLEYS	8	10.45786704	0.76497435	INDETERMINATE
769	WB31	PLEASANT VALLEY CREEK - CROMPTON	10/20/1998	41.29153056	-110.94510833	WYOMING BASIN	5	10.67962614	0.46818118	PARTIAL/NON SUPPORT
1598	SR40	PLUMBAGO CREEK - ABOVE QUARRY ROAD	8/25/2005	41.65631000	-105.52381000	SOUTHERN FOOTHILLS & LARAMIE RANGE	9	9.56397575	0.94103124	FULL SUPPORT
651	MRC66	Poison Creek - Dam	9/16/1998	44.12352500	-106.97546111	GRANITIC MOUNTAINS	16	15.38202440	1.04017518	FULL SUPPORT
711	NGP24	Poison Creek - Johnson	10/2/1998	44.07953611	-106.77396667	SOUTHERN ROCKIES	2	12.97867031	0.15409899	PARTIAL/NON SUPPORT
712	NGP25	Poison Creek - Lower	10/1/1998	44.08490000	-106.71369444	HIGH VALLEYS	4	9.34081600	0.42822811	PARTIAL/NON SUPPORT
1476	NGP188	POISON CREEK - OSAGE	10/5/2004	43.97065000	-104.44472222	NE PLAINS	2	8.92349689	0.22412738	PARTIAL/NON SUPPORT
1499	NGP189	POISON CREEK - PLAINS	10/6/2004	43.96613889	-104.43385278	NE PLAINS	6	8.92405234	0.67234030	INDETERMINATE
713	NGP26	Poison Creek - Upper	10/1/1998	44.07893056	-106.76377222	SOUTHERN ROCKIES	4	13.06841867	0.30608141	PARTIAL/NON SUPPORT
1595	WB224	POISON SPIDER CREEK - ABOVE IRON CREEK	7/26/2005	42.78275000	-106.54233000	WYOMING BASIN	8	10.42732691	0.76721484	INDETERMINATE
1467	WB221	POISON SPIDER CREEK - BELOW IRON CREEK	8/11/2004	42.78045833	-106.53579444	WYOMING BASIN	9	10.54174669	0.85374846	FULL SUPPORT
1594	WB221	POISON SPIDER CREEK - BELOW IRON CREEK	7/25/2005	42.78045833	-106.53579444	WYOMING BASIN	9	10.51783535	0.85568938	FULL SUPPORT
1596	WB225	POISON SPIDER CREEK - EMIGRANT GAP	7/27/2005	42.84444000	-106.60994000	WYOMING BASIN	8	12.19985421	0.65574554	INDETERMINATE
1597	WB226	POISON SPIDER CREEK - OIL MOUNTAIN	7/27/2005	42.82272000	-106.68256000	WYOMING BASIN	7	8.91095510	0.78554991	INDETERMINATE
714	NGP27	Pole Creek - Greub Road	10/1/1998	43.97700833	-106.76485000	NE PLAINS	8	8.87500674	0.90140777	FULL SUPPORT
652	MRC67	Pole Creek - Lower	9/15/1998	44.18931389	-106.92474167	GRANITIC MOUNTAINS	14	15.41583721	0.90815697	FULL SUPPORT
939	WB88	Pole Creek Lower/191	10/5/1999	42.79520833	-109.78832778	HIGH VALLEYS	13	11.33669930	1.14671825	FULL SUPPORT
653	MRC68	Pole Creek - Upper	9/15/1998	44.19956667	-106.94156944	GRANITIC MOUNTAINS	16	15.43062182	1.03689924	FULL SUPPORT
865	MRW95	Pole Creek Upper/Below Gagin Stn.	10/6/1999	42.88075556	-109.71809444	HIGH VALLEYS	14	15.42342483	0.90771020	FULL SUPPORT
1105	WB136	Polecat Creek above Sage Creek	10/16/2001	44.88263333	-108.54868333	WYOMING BASIN	5	7.39385991	0.67623678	INDETERMINATE
1104	WB135	Polecat Creek above WAW Road	10/16/2001	44.87296111	-108.65978056	WYOMING BASIN	4	8.09018607	0.49442621	PARTIAL/NON SUPPORT
403	WB18	POPO AGIE RIVER - WYPO BRIDGE	9/9/1997	42.86361111	-108.68666667	HIGH VALLEYS	8	8.74431808	0.91487980	FULL SUPPORT
8	MRC17	PORCUPINE CREEK	9/15/1993	44.83944444	-107.86861111	GRANITIC MOUNTAINS	12	13.58309964	0.88345078	FULL SUPPORT
1068	MRC17	PORCUPINE CREEK	8/22/2001	44.83944444	-107.86861111	GRANITIC MOUNTAINS	13	13.61046412	0.95514744	FULL SUPPORT
1094	MRC93	Porcupine Creek above Deer Creek	8/22/2001	44.98510300	-108.10097500	BIGHORN BASIN Foothills	11	13.21082216	0.83265068	INDETERMINATE

Assessment of Aquatic Biological Condition Using WY RIVPACS with Comparisons to the Wyoming Stream Integrity Index (WSII)

Appendix C (cont.) – WY RIVPACS O/E values and narrative ratings for 1993-2009 samples. Asterisks designate samples that were outside model experience.

SAMPLEID	STATIONID	WATERBODY NAME	COLLECTION DATE	LAT(N)	LONG(W)	2011 BIOREGION	O	E	OE	NARRATIVE RATING
1095	MRC94	Porcupine Creek below Porcupine Falls	8/23/2001	44.85576100	-107.91572500	SEDIMENTARY MOUNTAINS	12	13.66180284	0.87836138	FULL SUPPORT
899	NGP70	Posey Creek above South Fork Powder River	10/14/1999	43.51705000	-106.63971111	NE PLAINS	6	8.88804476	0.67506411	INDETERMINATE
1557	NGP0199	Powder River	10/25/2005	44.12680000	-106.14930000	NE PLAINS	7	8.92665879	0.78416798	FULL SUPPORT
1569	NGP0196	Powder River	10/24/2005	44.82890000	-106.06240000	NE PLAINS	3	8.92692222	0.33606207	PARTIAL/NON SUPPORT
1025	NGP90	Powder River - BLM Land	10/11/2000	44.97118056	-105.92261389	NE PLAINS	6	8.92574421	0.67221286	* INDETERMINATE
1305	NGP90	Powder River - BLM Land	10/16/2002	44.97118056	-105.92261389	NE PLAINS	5	8.92634059	0.56013995	* INDETERMINATE
1400	NGP90	Powder River - BLM Land	10/7/2003	44.97118056	-105.92261389	NE PLAINS	7	8.92634059	0.78419593	* FULL SUPPORT
1860	NGP0215	Powder River - Falxa Road	10/28/2008	44.00086534	-106.17770806	NE PLAINS	7	8.92605100	0.78422138	FULL SUPPORT
1013	NGP88	Powder River Above Barber Creek	10/17/2000	44.29878889	-106.15623611	NE PLAINS	1	8.92431525	0.11205342	PARTIAL/NON SUPPORT
908	NGP79	Powder River above Burger Draw	10/21/1999	44.14721944	-106.14250278	NE PLAINS	5	8.92450285	0.56025530	INDETERMINATE
1485	NGP79	Powder River above Burger Draw	9/23/2004	44.14721944	-106.14250278	NE PLAINS	5	8.92568165	0.56018131	INDETERMINATE
1017	NGP93	Powder River Above Crazy Woman Creek	10/23/2000	44.48240556	-106.13182500	NE PLAINS	1	8.92541556	0.11203960	PARTIAL/NON SUPPORT
1015	NGP95	Powder River Above Flying E Creek	10/16/2000	44.27093056	-106.13057778	NE PLAINS	1	8.92544639	0.11203921	PARTIAL/NON SUPPORT
1019	NGP98	Powder River Above Ivy Creek	10/11/2000	44.80898333	-106.08681111	NE PLAINS	3	8.92570657	0.33610784	PARTIAL/NON SUPPORT
1024	NGP100	Powder River Above LX Bar Creek	10/10/2000	44.91337500	-106.03098889	NE PLAINS	8	8.92513019	0.89634547	FULL SUPPORT
700	NGP13	Powder River above Salt Creek	10/13/1998	43.69094444	-106.35653889	NE PLAINS	5	8.92514842	0.56021477	INDETERMINATE
869	NGP13A	Powder River above Salt Creek	10/15/1999	43.69077500	-106.35583056	NE PLAINS	7	8.92715306	0.78412456	FULL SUPPORT
906	NGP77	Powder River at Falxa Homestead	10/25/1999	43.97460556	-106.16154722	NE PLAINS	5	8.92446830	0.56025747	INDETERMINATE
907	NGP78	Powder River at Red Draw	10/22/1999	43.98698333	-106.17577222	NE PLAINS	3	8.92424925	0.33616273	PARTIAL/NON SUPPORT
919	NGPI48	Powder River at School Section Draw	10/26/1999	43.91451667	-106.18020556	NE PLAINS	0	8.92595881	0.00000000	PARTIAL/NON SUPPORT
1023	NGP87	Powder River Below Arvada	8/4/2000	44.73287778	-106.10176944	NE PLAINS	0	8.92403607	0.00000000	PARTIAL/NON SUPPORT
1012	NGP89	Powder River Below Barber Creek	10/18/2000	44.35249167	-106.14953333	NE PLAINS	1	8.92485268	0.11204667	PARTIAL/NON SUPPORT
909	NGP80	Powder River below Burger Draw	10/21/1999	44.14731944	-106.14390556	NE PLAINS	5	8.92447927	0.56025678	INDETERMINATE
1507	NGP80	Powder River below Burger Draw	9/23/2004	44.14731944	-106.14390556	NE PLAINS	6	8.92762497	0.67207124	INDETERMINATE
1021	NGP91	Powder River Below Clear Creek	10/4/2000	44.88998611	-106.06514444	NE PLAINS	6	8.92419776	0.67232934	INDETERMINATE
1011	NGP92	Powder River Below Cottonwood Creek	10/24/2000	44.58481389	-106.08866667	NE PLAINS	4	8.92535737	0.44816133	PARTIAL/NON SUPPORT
1018	NGP94	Powder River Below Crazy Woman Creek	10/23/2000	44.48587778	-106.11681111	NE PLAINS	0	8.92564622	0.00000000	PARTIAL/NON SUPPORT
1014	NGP96	Powder River Below Flying E Creek	10/17/2000	44.27627222	-106.12615278	NE PLAINS	4	8.92510451	0.44817402	PARTIAL/NON SUPPORT
1010	NGP97	Powder River Below Indian Creek	10/16/2000	44.18272200	-106.14902700	NE PLAINS	2	8.92455252	0.22410087	PARTIAL/NON SUPPORT
1016	NGP99	Powder River Below Ivy Creek	10/3/2000	44.84562500	-106.06353889	NE PLAINS	6	8.92494802	0.67227282	INDETERMINATE
1022	NGP101	Powder River Below LX Bar Creek	10/10/2000	44.93499722	-105.96547500	NE PLAINS	8	8.92577017	0.89628120	* FULL SUPPORT
754	NGPI46	Powder River below Salt Creek	10/15/1998	43.69715833	-106.30540556	NE PLAINS	4	8.92512716	0.44817289	PARTIAL/NON SUPPORT
918	NGPI46A	Powder River below Salt Creek	10/15/1999	43.69350556	-106.30601944	NE PLAINS	4	8.92270776	0.44829441	PARTIAL/NON SUPPORT
905	NGP76	Powder River below South Fork Powder River	10/6/1999	43.67154444	-106.51265556	NE PLAINS	6	8.92005308	0.67264174	INDETERMINATE
1020	NGP102	Powder River Below Spotted Horse Creek	10/4/2000	44.86009722	-106.05667222	NE PLAINS	4	8.92597650	0.44813024	PARTIAL/NON SUPPORT
1009	NGP103	Powder River Near Taylor Draw	10/19/2000	44.40582222	-106.14906111	NE PLAINS	1	8.92527409	0.11204138	PARTIAL/NON SUPPORT
715	NGP28	Prairie Dog Creek - Above Cat Creek	10/23/1998	44.84748889	-106.86436111	HIGH VALLEYS	7	9.61970555	0.72767300	INDETERMINATE
732	NGPI11	PRAIRIE DOG CREEK - ABOVE JENKS CR.	10/6/1998	44.61900833	-106.84316389	HIGH VALLEYS	11	9.47303891	1.16119021	FULL SUPPORT
734	NGPI13	PRAIRIE DOG CREEK - ABOVE MEADE CR.	10/8/1998	44.69469722	-106.85270833	HIGH VALLEYS	9	9.53013221	0.94437305	FULL SUPPORT
716	NGP29	Prairie Dog Creek - Above Murphy Gulch	10/7/1998	44.62999444	-106.83502222	HIGH VALLEYS	8	9.46906245	0.84485661	INDETERMINATE
717	NGP30	Prairie Dog Creek - Below Cat Creek	10/23/1998	44.85013333	-106.86472500	HIGH VALLEYS	9	8.65312041	1.04008723	FULL SUPPORT
718	NGP31	Prairie Dog Creek - Below Highway 14	10/8/1998	44.73890833	-106.87871667	HIGH VALLEYS	8	10.23093937	0.78194188	INDETERMINATE
733	NGPI12	PRAIRIE DOG CREEK - BELOW JENKS CR.	10/6/1998	44.61991667	-106.84372500	HIGH VALLEYS	8	9.37270351	0.85354242	INDETERMINATE
719	NGP32	Prairie Dog Creek - Below Meade Creek	10/7/1998	44.70525278	-106.85844444	HIGH VALLEYS	7	9.96738729	0.70229036	INDETERMINATE
720	NGP33	Prairie Dog Creek - Below Murphy Gulch	10/7/1998	44.65965556	-106.83676111	HIGH VALLEYS	7	9.79733276	0.71448017	INDETERMINATE
30	MRC3	PROSPECT CREEK	9/16/1993	44.64277778	-107.50861111	SEDIMENTARY MOUNTAINS	10	13.43956136	0.74407190	INDETERMINATE
632	MRC48	Prune Creek - Above Sibley Lake	8/5/1998	44.75787222	-107.43633056	GRANITIC MOUNTAINS	16	14.58730893	1.09684384	FULL SUPPORT
61	MRC139	PRUNE CREEK - PRUNE CAMPGROUND	8/24/1995	44.76888889	-107.46722222	GRANITIC MOUNTAINS	16	14.20543786	1.12632924	FULL SUPPORT

Assessment of Aquatic Biological Condition Using WY RIVPACS with Comparisons to the Wyoming Stream Integrity Index (WSII)

Appendix C (cont.) – WY RIVPACS O/E values and narrative ratings for 1993-2009 samples. Asterisks designate samples that were outside model experience.

SAMPLEID	STATIONID	WATERBODY NAME	COLLECTION DATE	LAT(N)	LONG(W)	2011 BIOREGION	O	E	OE	NARRATIVE RATING
673	MRCI39	PRUNE CREEK - PRUNE CAMPGROUND	8/6/1998	44.76888889	-107.46722222	GRANITIC MOUNTAINS	16	14.20543786	1.12632924	FULL SUPPORT
60	MRCI38	PRUNE CREEK - SIBLEY LAKE	8/24/1995	44.76028333	-107.44562778	GRANITIC MOUNTAINS	16	14.67151143	1.09054886	FULL SUPPORT
672	MRCI38	PRUNE CREEK - SIBLEY LAKE	8/6/1998	44.76028333	-107.44562778	GRANITIC MOUNTAINS	15	14.67151143	1.02238955	FULL SUPPORT
1918	SR0065	RABBIT CREEK - BEAR ROCKS	9/29/2009	42.53082200	-105.75016110	SOUTHERN FOOTHILLS & LARAMIE RANGE	5	8.42781871	0.59327332	PARTIAL/NON SUPPORT
59	MRCI36	RAPID CREEK	10/7/1996	44.61666667	-107.18166667	SEDIMENTARY MOUNTAINS	8	15.27431776	0.52375498	PARTIAL/NON SUPPORT
107	MRW36	RAYMOND CREEK	9/24/1996	42.27666667	-111.02138889	SEDIMENTARY MOUNTAINS	7	7.95198513	0.88028334	FULL SUPPORT
1209	WB149	Red Canyon Creek - Bison Ranch	8/13/2001	43.60053056	-108.33243889	BIGHORN BASIN FOOTHILLS	4	7.08115257	0.56487979	PARTIAL/NON SUPPORT
1691	WB0280	Red Ck 7300	7/25/2006	41.06828611	-109.06498055	WYOMING BASIN	10	11.17076596	0.89519376	FULL SUPPORT
1865	WB0280	Red Ck 7300	7/23/2008	41.06828611	-109.06498055	WYOMING BASIN	11	11.12138775	0.98908520	FULL SUPPORT
1202	WB119	Red Creek Beef Steer	9/13/2000	41.06942500	-109.16884167	WYOMING BASIN	4	9.31266268	0.42952270	PARTIAL/NON SUPPORT
1204	WB121	Red Creek Pine Mountain	9/14/2000	41.06850833	-109.07087500	WYOMING BASIN	8	11.11940745	0.71946280	INDETERMINATE
1042	WB120	Red Creek Richards Gap	10/13/2000	41.04148056	-109.07929722	WYOMING BASIN	2	9.41866185	0.21234439	PARTIAL/NON SUPPORT
1203	WB120	Red Creek Richards Gap	9/13/2000	41.04148056	-109.07929722	WYOMING BASIN	7	9.41866185	0.74320536	INDETERMINATE
337	NGPI22	REDWATER CREEK	10/3/1997	44.54833333	-104.13138889	BLACK HILLS	8	8.92854649	0.89600250	FULL SUPPORT
1761	MRE0023	Redwater Creek Sugarloaf Mountain	9/18/2007	44.56080000	-104.25700000	BLACK HILLS	6	9.36565199	0.64063879	INDETERMINATE
94	MRW17	ROARING FORK	10/3/1996	43.35821667	-109.92280278	SEDIMENTARY MOUNTAINS	10	10.20374843	0.98003200	FULL SUPPORT
352	MRW17	ROARING FORK	10/15/1997	43.35821667	-109.92280278	SEDIMENTARY MOUNTAINS	8	8.63125881	0.92686364	FULL SUPPORT
681	MRW17	ROARING FORK	8/31/1998	43.35821667	-109.92280278	SEDIMENTARY MOUNTAINS	11	10.17051415	1.08155791	FULL SUPPORT
855	MRW17	ROARING FORK	10/7/1999	43.35821667	-109.92280278	SEDIMENTARY MOUNTAINS	10	8.63788511	1.15769079	FULL SUPPORT
1188	MRW17	ROARING FORK	9/26/2000	43.35821667	-109.92280278	SEDIMENTARY MOUNTAINS	11	11.30421820	0.97308808	FULL SUPPORT
1189	MRW17	ROARING FORK	9/25/2001	43.35821667	-109.92280278	SEDIMENTARY MOUNTAINS	12	11.30421820	1.06155063	FULL SUPPORT
1331	MRW17	ROARING FORK	9/25/2002	43.35821667	-109.92280278	SEDIMENTARY MOUNTAINS	12	13.51086876	0.88817383	FULL SUPPORT
1415	MRW17	ROARING FORK	10/8/2003	43.35821667	-109.92280278	SEDIMENTARY MOUNTAINS	10	13.51086876	0.74014486	INDETERMINATE
1872	MRW17	ROARING FORK	9/22/2008	43.35821667	-109.92280278	SEDIMENTARY MOUNTAINS	8	9.14645568	0.87465574	FULL SUPPORT
322	MRW35	ROCK CREEK	9/17/1997	42.28861111	-110.42861111	SEDIMENTARY MOUNTAINS	7	8.25605902	0.84786216	FULL SUPPORT
627	MRC43	ROCK CREEK	10/7/1998	43.57639722	-107.14254167	BIGHORN BASIN FOOTHILLS	13	15.59413646	0.83364667	INDETERMINATE
1703	MRW35	ROCK CREEK	9/25/2006	42.28861111	-110.42861111	SEDIMENTARY MOUNTAINS	5	8.28900171	0.60320895	PARTIAL/NON SUPPORT
721	NGP34	Rock Creek - Above Highway 87	10/22/1998	44.38450833	-106.70562500	HIGH VALLEYS	12	9.62651857	1.24655657	FULL SUPPORT
1899	WB0314	ROCK CREEK - ABOVE THREEMILE CREEK	7/21/2009	41.72138700	-106.02279430	HIGH VALLEYS	9	10.20707925	0.88174097	FULL SUPPORT
1898	SR0060	ROCK CREEK - ARLINGTON	7/20/2009	41.59328250	-106.20932100	SOUTHERN FOOTHILLS & LARAMIE RANGE	14	15.37583792	0.91051948	FULL SUPPORT
722	NGP35	Rock Creek - Below Sayles Creek	10/21/1998	44.42450278	-106.78526111	HIGH VALLEYS	7	9.48886881	0.73770648	INDETERMINATE
1902	WB0317	ROCK CREEK - COMO BLUFFS	7/24/2009	41.92648140	-106.05179510	WYOMING BASIN	7	8.92776059	0.78407120	INDETERMINATE
1900	WB0315	ROCK CREEK - FETTERMAN ROAD	7/22/2009	41.79693630	-105.92742130	HIGH VALLEYS	3	9.15186750	0.32780195	PARTIAL/NON SUPPORT
306	MRW77	ROCK CREEK - LOWER	9/3/1997	43.69472222	-109.10861111	VOLCANIC MOUNTAINS & VALLEYS	12	9.14215117	1.31260135	FULL SUPPORT
232	SR3	ROCK CREEK - REFERENCE	9/12/1996	41.57673889	-106.22973611	SOUTHERN ROCKIES	14	18.01538570	0.77711353	INDETERMINATE
392	SR3	ROCK CREEK - REFERENCE	9/11/1997	41.57673889	-106.22973611	SOUTHERN ROCKIES	14	17.85382481	0.78414570	INDETERMINATE
764	SR3	ROCK CREEK - REFERENCE	10/7/1998	41.57673889	-106.22973611	SOUTHERN ROCKIES	15	18.16203684	0.82589856	INDETERMINATE
922	SR3	ROCK CREEK - REFERENCE	9/27/1999	41.57673889	-106.22973611	SOUTHERN ROCKIES	15	17.85382481	0.84015611	INDETERMINATE
1026	SR3	ROCK CREEK - REFERENCE	9/19/2000	41.57673889	-106.22973611	SOUTHERN ROCKIES	20	18.12496713	1.10345028	FULL SUPPORT
1119	SR3	ROCK CREEK - REFERENCE	9/13/2001	41.57673889	-106.22973611	SOUTHERN ROCKIES	20	17.97310361	1.11277387	FULL SUPPORT
1254	SR3	ROCK CREEK - REFERENCE	9/6/2002	41.57673889	-106.22973611	SOUTHERN ROCKIES	20	17.81984997	1.12234391	FULL SUPPORT
1913	SR3	ROCK CREEK - REFERENCE	9/15/2009	41.57673889	-106.22973611	SOUTHERN ROCKIES	19	17.84091300	1.06496792	FULL SUPPORT
1901	WB0316	ROCK CREEK - SODA LAKES	7/23/2009	41.90109350	-105.95943210	WYOMING BASIN	7	8.92795843	0.78405383	INDETERMINATE
305	MRWI42	ROCK CREEK - UPPER	9/3/1997	43.73055556	-109.13944444	VOLCANIC MOUNTAINS & VALLEYS	13	10.93383328	1.18897002	FULL SUPPORT
654	MRC69	Rock Creek - USGS Gage	10/20/1998	44.45502778	-106.87456111	SOUTHERN ROCKIES	16	14.15818388	1.13008844	FULL SUPPORT
1663	WB0265	Sage Creek	11/1/2006	44.86155360	-108.46709040	WYOMING BASIN	5	5.67185283	0.88154615	FULL SUPPORT
404	WHP8	SAGE CREEK - HAT CREEK STATION	10/16/1997	42.93000000	-104.34500000	NE PLAINS	5	8.92832590	0.56001540	INDETERMINATE
1097	WB140	Sage Creek above Shoshone River	10/17/2001	44.84603889	-108.41105556	WYOMING BASIN	6	5.22127093	1.14914550	FULL SUPPORT

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SAMPLEID	STATIONID	WATERBODY NAME	COLLECTION DATE	LAT(N)	LONG(W)	2011 BIOREGION	O	E	OE	NARRATIVE RATING
1096	WB139	Sage Creek below Frannie	10/18/2001	44.94044167	-108.59924167	WYOMING BASIN	6	6.41123023	0.93585783	FULL SUPPORT
1664	WB139	Sage Creek below Frannie	10/31/2006	44.94044167	-108.59924167	WYOMING BASIN	5	6.36224929	0.78588558	INDETERMINATE
1100	WB141	Sage Creek below Polecat Creek	10/17/2001	44.88620833	-108.54860556	WYOMING BASIN	7	5.16064373	1.35641993	FULL SUPPORT
691	MRW82	SALT CREEK - 89 CANYON	10/8/1998	42.40358056	-111.03118889	SEDIMENTARY MOUNTAINS	10	9.76493779	1.02407206	FULL SUPPORT
155	MRW116	SALT CREEK - LOWER	10/3/1995	42.40388889	-111.02916667	SEDIMENTARY MOUNTAINS	7	9.78892019	0.71509419	INDETERMINATE
200	NGPI2	SALT CREEK - MIDDLE	10/17/1996	43.40583333	-106.26277778	NE PLAINS	7	8.92789621	0.78405929	FULL SUPPORT
914	NGPI2	SALT CREEK - MIDDLE	9/9/1999	43.40583333	-106.26277778	NE PLAINS	3	8.92448097	0.33615400	PARTIAL/NON SUPPORT
176	MRW137	SALT CREEK - UPPER	8/3/1995	42.40194444	-110.99027778	SEDIMENTARY MOUNTAINS	6	8.89995698	0.67416056	PARTIAL/NON SUPPORT
192	NGPI1	SALT CREEK - UPPER	10/23/1996	43.32111111	-106.18361111	NE PLAINS	3	8.92732163	0.33604704	PARTIAL/NON SUPPORT
753	NGPI45	Salt Creek above Cottonwood	8/26/1998	43.37459722	-106.22563611	NE PLAINS	5	8.92694509	0.56010202	INDETERMINATE
917	NGPI45A	Salt Creek above Cottonwood Creek	9/13/1999	43.37475833	-106.22555278	NE PLAINS	5	8.92497543	0.56022563	INDETERMINATE
752	NGPI44	Salt Creek above Meadow Creek	10/14/1998	43.57822222	-106.34775278	NE PLAINS	4	8.92785640	0.44803588	PARTIAL/NON SUPPORT
916	NGPI44	Salt Creek above Meadow Creek	8/31/1999	43.57822222	-106.34775278	NE PLAINS	3	8.92794920	0.33602342	PARTIAL/NON SUPPORT
1676	NGP142	Salt Creek above Stockade Beaver Creek	8/22/2006	43.80732222	-104.13710833	NE PLAINS	1	8.92741370	0.11201452	PARTIAL/NON SUPPORT
751	NGPI43	Salt Creek below Meadow Creek	10/14/1998	43.58328056	-106.35564167	NE PLAINS	5	8.92754071	0.56006465	INDETERMINATE
872	NGPI43	Salt Creek below Meadow Creek	8/30/1999	43.58328056	-106.35564167	NE PLAINS	5	8.92693005	0.56010297	INDETERMINATE
209	NGPI3	Salt Creek below Midwest	10/17/1996	43.44474722	-106.28000278	NE PLAINS	4	8.92796753	0.44803030	PARTIAL/NON SUPPORT
740	NGPI3	Salt Creek below Midwest	10/15/1998	43.44474722	-106.28000278	NE PLAINS	2	8.92817857	0.22400986	PARTIAL/NON SUPPORT
915	NGPI3	Salt Creek below Midwest	9/9/1999	43.44474722	-106.28000278	NE PLAINS	1	8.92808182	0.11200614	PARTIAL/NON SUPPORT
750	NGPI42	Salt Creek lower - Above Powder River	10/13/1998	43.68452500	-106.32767778	NE PLAINS	6	8.92770234	0.67206542	INDETERMINATE
871	NGPI42	Salt Creek lower - Above Powder River	9/1/1999	43.68452500	-106.32767778	NE PLAINS	4	8.92796931	0.44803021	PARTIAL/NON SUPPORT
384	MRW25	SALT RIVER	10/16/1997	42.52500000	-110.88194444	SEDIMENTARY MOUNTAINS	10	8.92062509	1.12099768	FULL SUPPORT
1622	MRW25	SALT RIVER	10/19/2005	42.52500000	-110.88194444	SEDIMENTARY MOUNTAINS	10	8.94813166	1.11755173	FULL SUPPORT
1896	MRW25	SALT RIVER	10/14/2009	42.52500000	-110.88194444	SEDIMENTARY MOUNTAINS	8	8.94966778	0.89388793	FULL SUPPORT
1895	MRW0174	Salt River-North Thayne	10/13/2009	42.93443215	-111.01596740	VOLCANIC MOUNTAINS & VALLEYS	12	11.43373025	1.04952625	FULL SUPPORT
363	WB1	SALT WELLS CREEK	10/21/1997	41.45916667	-108.94638889	WYOMING BASIN	4	9.43373402	0.42401026	PARTIAL/NON SUPPORT
335	WB112	SAND CREEK	10/2/1997	42.26416667	-107.11694444	WYOMING BASIN	6	6.83731377	0.87753761	FULL SUPPORT
1231	WB112	SAND CREEK	10/30/2001	42.26416667	-107.11694444	WYOMING BASIN	6	6.85852079	0.87482421	FULL SUPPORT
1903	WB0318	SAND CREEK - ARKANSAS FLATS	8/12/2009	42.31520960	-107.05286820	WYOMING BASIN	9	11.92298740	0.75484438	INDETERMINATE
364	MRE13	SAND CREEK - CROSSING	10/21/1997	44.41305556	-104.09583333	BLACK HILLS	9	8.12742942	1.10736120	FULL SUPPORT
1769	MRE13	SAND CREEK - CROSSING	10/30/2007	44.41305556	-104.09583333	BLACK HILLS	8	8.11874573	0.98537388	FULL SUPPORT
73	MRE3	SAND CREEK - LOWER	9/20/1994	44.49222222	-104.10861111	BLACK HILLS	10	11.24530094	0.88926033	* FULL SUPPORT
1359	MRE3	SAND CREEK - LOWER	7/31/2003	44.49222222	-104.10861111	BLACK HILLS	10	11.25262419	0.88868159	* FULL SUPPORT
72	MRE2	SAND CREEK - UPPER	9/20/1994	44.49027778	-104.10694444	BLACK HILLS	12	11.24286301	1.06734379	* FULL SUPPORT
626	MRC42	Sawmill Creek	8/20/1998	43.89464167	-107.03122500	SEDIMENTARY MOUNTAINS	12	13.98527220	0.85804551	FULL SUPPORT
1754	MRC0114	Sheep Creek	8/29/2007	44.85494400	-107.46038300	SEDIMENTARY MOUNTAINS	12	12.75784899	0.94059743	FULL SUPPORT
5	MRC13	SHELL CREEK	9/16/1993	44.57972222	-107.68833333	BIGHORN BASIN FOOTHILLS	11	12.40626311	0.88664894	FULL SUPPORT
1576	WB0249	SHELL CREEK	8/31/2005	44.54170000	-107.87590000	WYOMING BASIN	8	13.18889078	0.60657110	PARTIAL/NON SUPPORT
1667	WB0258	Shoshone River	10/31/2006	44.86487300	-108.28036120	WYOMING BASIN	7	6.84705156	1.02233785	* FULL SUPPORT
1835	WB0303	Shoshone River - Below Belfry Bridge	8/21/2008	44.53811700	-109.06020500	WYOMING BASIN	7	9.65527413	0.72499236	INDETERMINATE
1923	WB0303	Shoshone River - Below Belfry Bridge	8/18/2009	44.53811700	-109.06020500	WYOMING BASIN	7	9.65527413	0.72499236	INDETERMINATE
1836	WB0309	Shoshone River - below Iron Creek	8/21/2008	44.64020462	-108.94020834	WYOMING BASIN	7	9.66709414	0.72410591	INDETERMINATE
1925	WB0309	Shoshone River - below Iron Creek	8/18/2009	44.64020462	-108.94020834	WYOMING BASIN	8	9.66709414	0.82754961	FULL SUPPORT
1834	WB0302	Shoshone River - below Sulphur Creek	8/20/2008	44.52906200	-109.08338700	WYOMING BASIN	6	9.66203474	0.62098721	PARTIAL/NON SUPPORT
1922	WB0302	Shoshone River - below Sulphur Creek	8/17/2009	44.52906200	-109.08338700	WYOMING BASIN	6	9.66203474	0.62098721	PARTIAL/NON SUPPORT
1837	WB0311	Shoshone River - below Willwood Dam	8/21/2008	44.67642487	-108.91299762	WYOMING BASIN	7	9.13124393	0.76659873	INDETERMINATE
1926	WB0311	Shoshone River - below Willwood Dam	8/18/2009	44.67642487	-108.91299762	WYOMING BASIN	5	9.13124393	0.54757052	PARTIAL/NON SUPPORT
1838	WB0307	Shoshone River - Corbett Bridge	8/27/2008	44.59250534	-108.94788093	WYOMING BASIN	7	9.16434915	0.76382948	INDETERMINATE

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1924	WB0307	Shoshone River - Corbett Bridge	8/18/2009	44.59250534	-108.94788093	WYOMING BASIN	7	9.16434915	0.76382948	INDETERMINATE
936	WB85	Shoshone River (Corbett)	10/21/1999	44.59247222	-108.94791667	WYOMING BASIN	5	9.18307463	0.54447995	PARTIAL/NON SUPPORT
1503	WB0218	Shoshone River (Station 4317)	8/26/2004	44.69968611	-108.80893056	WYOMING BASIN	7	8.55142036	0.81857746	FULL SUPPORT
1093	WB138	Shoshone River above Sand Draw	10/23/2001	44.85377222	-108.36824167	WYOMING BASIN	8	6.75544764	1.18422944 *	FULL SUPPORT
1921	WB0328	Shoshone River above Sulphur Creek	8/17/2009	44.52390712	-109.08550296	WYOMING BASIN	8	9.65331039	0.82873125	FULL SUPPORT
1106	WB137	Shoshone River above Yellowtail Reservoir	10/23/2001	44.86928056	-108.21740556	WYOMING BASIN	8	6.97145877	1.14753601 *	FULL SUPPORT
382	MRW20	SILAS CREEK - SHOSHONE NATL. FOREST	9/10/1997	42.61611111	-108.87888889	GRANITIC MOUNTAINS	16	14.58118249	1.09730469	FULL SUPPORT
1530	MRW20	SILAS CREEK - SHOSHONE NATL. FOREST	9/13/2004	42.61611111	-108.87888889	GRANITIC MOUNTAINS	17	17.98197159	0.94539133	FULL SUPPORT
1792	MRW20	SILAS CREEK - SHOSHONE NATL. FOREST	9/10/2007	42.61611111	-108.87888889	GRANITIC MOUNTAINS	15	17.00905150	0.88188339	INDETERMINATE
1668	MRW0156	Slate Ck Middle (above Loop Road)	6/21/2006	42.52374166	-108.79206660	SEDIMENTARY MOUNTAINS	5	11.80263062	0.42363437	PARTIAL/NON SUPPORT
1692	MRW0153	Slate Ck above Haystack	8/1/2006	43.62520035	-110.40557638	SEDIMENTARY MOUNTAINS	6	9.54638849	0.62850993	PARTIAL/NON SUPPORT
1671	MRW0155	Slate Ck Below Loop Rd	6/21/2006	42.52426900	-108.78908300	SEDIMENTARY MOUNTAINS	8	11.81407545	0.67715836	PARTIAL/NON SUPPORT
109	MRW38	SLOUGH CREEK	9/13/1994	44.95333333	-110.29944444	VOLCANIC MOUNTAINS & VALLEYS	7	10.40078193	0.67302632	INDETERMINATE
1649	MRW38	SLOUGH CREEK	9/26/2006	44.95333333	-110.29944444	VOLCANIC MOUNTAINS & VALLEYS	8	10.40700207	0.76871321	INDETERMINATE
217	NGP17	SMITH CREEK - LOWER	10/9/1996	44.87805556	-107.26750000	HIGH VALLEYS	7	9.64259715	0.72594550	INDETERMINATE
342	NGP17	SMITH CREEK - LOWER	10/9/1997	44.87805556	-107.26750000	HIGH VALLEYS	10	9.65425663	1.03581253	FULL SUPPORT
1036	SR32	Smith/North Creek - Below Mouth of Canyon	9/12/2000	41.11839444	-106.25194167	SOUTHERN ROCKIES	11	11.69261201	0.94076499	FULL SUPPORT
1418	WU0002	Smiths Fork Section 12	10/27/2003	41.11792500	-110.44282778	HIGH VALLEYS	11	12.26797153	0.89664375	FULL SUPPORT
1527	MRW0139	Smiths Fork BLM	9/27/2004	42.11121944	-110.91048333	HIGH VALLEYS	13	12.77987045	1.01722471	FULL SUPPORT
768	WB30	SMITHS FORK - BRIDGE/HWY 80 (GREEN RIVER)	10/27/1998	41.37297778	-110.20428056	WYOMING BASIN	5	13.33996787	0.37481350	PARTIAL/NON SUPPORT
693	MRW84	SMITHS FORK - CLARKS (BEAR RIVER)	9/23/1998	42.22642778	-110.87692778	HIGH VALLEYS	15	13.92202133	1.07742975	FULL SUPPORT
784	WB46	SMITHS FORK - ROCKY (BEAR RIVER)	9/23/1998	42.09594167	-110.94309444	HIGH VALLEYS	16	12.74066435	1.25582148	FULL SUPPORT
120	MRW5	SMITHS FORK RIVER	9/25/1996	42.47722222	-110.83361111	SEDIMENTARY MOUNTAINS	9	8.95508229	1.00501589	FULL SUPPORT
1614	MRW5	SMITHS FORK RIVER	10/18/2005	42.47722222	-110.83361111	SEDIMENTARY MOUNTAINS	11	8.94855319	1.22924899	FULL SUPPORT
1870	MRW5	SMITHS FORK RIVER	10/15/2008	42.47722222	-110.83361111	SEDIMENTARY MOUNTAINS	10	8.96591723	1.11533486	FULL SUPPORT
153	MRW14	SMITHS FORK RIVER - 6800	10/12/1994	42.34611111	-110.87250000	SEDIMENTARY MOUNTAINS	9	9.77118961	0.92107516	FULL SUPPORT
1047	MRW14	SMITHS FORK RIVER - 6800	9/22/1998	42.34611111	-110.87250000	SEDIMENTARY MOUNTAINS	8	9.77021351	0.81881527	INDETERMINATE
1627	MRW14	SMITHS FORK RIVER - 6800	9/27/2005	42.34611111	-110.87250000	SEDIMENTARY MOUNTAINS	12	10.77376996	1.11381624	FULL SUPPORT
124	MRW55	SMITHS FORK RIVER - Tuffield	9/25/1996	42.34569444	-110.87277500	SEDIMENTARY MOUNTAINS	12	10.26450479	1.16907734	FULL SUPPORT
686	MRW55	SMITHS FORK RIVER - Tuffield	9/22/1998	42.34569444	-110.87277500	SEDIMENTARY MOUNTAINS	7	9.77114839	0.71639481	INDETERMINATE
1617	MRW55	SMITHS FORK RIVER - Tuffield	9/28/2005	42.34569444	-110.87277500	SEDIMENTARY MOUNTAINS	11	10.26377307	1.07173063	FULL SUPPORT
171	MRW132	SMITHS FORK RIVER - UPPER	10/12/1994	42.37944444	-110.85527778	SEDIMENTARY MOUNTAINS	9	10.32242792	0.87188790	FULL SUPPORT
1626	MRW132	SMITHS FORK RIVER - UPPER	9/26/2005	42.37944444	-110.85527778	SEDIMENTARY MOUNTAINS	10	9.79432791	1.02099910	FULL SUPPORT
125	MRW57	Snake River - Alpine	9/1/1994	43.20416667	-110.83000000	VOLCANIC MOUNTAINS & VALLEYS	10	12.47544878	0.80157437	INDETERMINATE
102	MRW3	SNAKE RIVER - FLAGG RANCH	8/31/1993	44.10078333	-110.66946111	SEDIMENTARY MOUNTAINS	6	10.67278863	0.56217735	PARTIAL/NON SUPPORT
103	MRW3	SNAKE RIVER - FLAGG RANCH	8/31/1994	44.10078333	-110.66946111	SEDIMENTARY MOUNTAINS	8	10.05122742	0.79592269	INDETERMINATE
104	MRW3	SNAKE RIVER - FLAGG RANCH	9/8/1995	44.10078333	-110.66946111	SEDIMENTARY MOUNTAINS	10	10.15670097	0.98457167	FULL SUPPORT
105	MRW3	SNAKE RIVER - FLAGG RANCH	9/5/1996	44.10078333	-110.66946111	SEDIMENTARY MOUNTAINS	8	10.67278863	0.74956980	INDETERMINATE
321	MRW3	SNAKE RIVER - FLAGG RANCH	9/16/1997	44.10078333	-110.66946111	SEDIMENTARY MOUNTAINS	9	10.67278863	0.84326602	FULL SUPPORT
683	MRW3	SNAKE RIVER - FLAGG RANCH	10/7/1998	44.10078333	-110.66946111	SEDIMENTARY MOUNTAINS	7	10.12575983	0.69130615	INDETERMINATE
857	MRW3	SNAKE RIVER - FLAGG RANCH	9/1/1999	44.10078333	-110.66946111	SEDIMENTARY MOUNTAINS	8	10.14116032	0.78886437	INDETERMINATE
1190	MRW3	SNAKE RIVER - FLAGG RANCH	8/30/2000	44.10078333	-110.66946111	SEDIMENTARY MOUNTAINS	7	10.13773901	0.69048927	INDETERMINATE
1191	MRW3	SNAKE RIVER - FLAGG RANCH	9/5/2001	44.10078333	-110.66946111	SEDIMENTARY MOUNTAINS	7	10.13773901	0.69048927	INDETERMINATE
1322	MRW3	SNAKE RIVER - FLAGG RANCH	8/28/2002	44.10078333	-110.66946111	SEDIMENTARY MOUNTAINS	7	10.13806856	0.69046682	INDETERMINATE
1339	MRW3	SNAKE RIVER - FLAGG RANCH	9/2/2003	44.10078333	-110.66946111	SEDIMENTARY MOUNTAINS	8	10.12269772	0.79030316	INDETERMINATE
110	MRW39	SNAKE RIVER - YELLOWSTONE	9/8/1995	44.13666667	-110.66416667	SEDIMENTARY MOUNTAINS	10	10.70144389	0.93445334	FULL SUPPORT
1888	MRW0170	Snake River-Camp 4	8/31/2009	44.08637743	-110.69762910	VOLCANIC MOUNTAINS & VALLEYS	9	10.66931778	0.84354034	INDETERMINATE
1041	SR34	So. Fk. Little Laramie River-Below FS Road 500Xing	9/29/2000	41.18701000	-106.15326000	SOUTHERN ROCKIES	16	18.75486426	0.85311201	INDETERMINATE

Assessment of Aquatic Biological Condition Using WY RIVPACS with Comparisons to the Wyoming Stream Integrity Index (WSII)

Appendix C (cont.) – WY RIVPACS O/E values and narrative ratings for 1993–2009 samples. Asterisks designate samples that were outside model experience.

SAMPLEID	STATIONID	WATERBODY NAME	COLLECTION DATE	LAT(N)	LONG(W)	2011 BIOREGION	O	E	OE	NARRATIVE RATING
169	MRW130	SODA BUTTE CREEK	9/13/1994	44.99277778	-110.05194444	VOLCANIC MOUNTAINS & VALLEYS	9	10.10307745	0.89081768	FULL SUPPORT
1370	NGP0165	Soldier Creek	9/12/2003	44.80139167	-107.10502222	HIGH VALLEYS	5	8.99098185	0.55611279	PARTIAL/NON SUPPORT
1180	MRC79	Soldier Creek Buck	9/19/2000	44.25348333	-107.27258056	SEDIMENTARY MOUNTAINS	16	17.01725168	0.94022233	FULL SUPPORT
1181	MRC80	Soldier Creek Camp	9/19/2000	44.23351944	-107.29973056	SEDIMENTARY MOUNTAINS	12	15.46279838	0.77605616	INDETERMINATE
892	NGP63	Soldier Creek - County Road 330	9/9/1999	44.82090278	-107.02638889	HIGH VALLEYS	8	9.91718012	0.80668092	INDETERMINATE
1367	NGP63	Soldier Creek - County Road 330	9/16/2003	44.82090278	-107.02638889	HIGH VALLEYS	6	9.37891104	0.63973312	PARTIAL/NON SUPPORT
833	MRC78	Soldier Creek - PK Ranch	9/7/1999	44.73435278	-107.21830278	SEDIMENTARY MOUNTAINS	3	13.68317261	0.21924740	PARTIAL/NON SUPPORT
1421	MRC78	Soldier Creek - PK Ranch	9/11/2003	44.73435278	-107.21830278	SEDIMENTARY MOUNTAINS	7	8.19585002	0.85409079	FULL SUPPORT
893	NGP64	Soldier Creek - Sheridan	9/9/1999	44.81918333	-106.96322778	HIGH VALLEYS	6	9.26422100	0.64765294	PARTIAL/NON SUPPORT
1396	NGP64	Soldier Creek - Sheridan	9/9/2003	44.81918333	-106.96322778	HIGH VALLEYS	7	9.67136254	0.72378633	INDETERMINATE
834	MRC77	Soldier Creek - Upper	9/8/1999	44.77768611	-107.17624444	HIGH VALLEYS	9	12.44577309	0.72313708	INDETERMINATE
1366	MRC77	Soldier Creek - Upper	9/11/2003	44.77768611	-107.17624444	HIGH VALLEYS	12	13.43461297	0.89322156	FULL SUPPORT
655	MRC70	Sourdough Creek - Lower	9/23/1998	44.27500556	-106.92260833	GRANITIC MOUNTAINS	15	14.40284292	1.04146106	FULL SUPPORT
656	MRC71	Sourdough Creek - Upper	9/23/1998	44.24016111	-106.96542778	GRANITIC MOUNTAINS	18	15.49948737	1.16132873	FULL SUPPORT
13	MRC2	SOUTH BEAVER CREEK	9/15/1993	44.75111111	-107.76694444	GRANITIC MOUNTAINS	9	13.47478424	0.66791422	INDETERMINATE
1560	MRC2	SOUTH BEAVER CREEK	9/17/2005	44.75111111	-107.76694444	GRANITIC MOUNTAINS	8	13.47382070	0.59374399	PARTIAL/NON SUPPORT
1578	SR43	SOUTH CHUGWATER CREEK - BALDY MOUNTAIN	10/13/2005	41.50836667	-105.43304444	SOUTHERN FOOTHILLS & LARAMIE RANGE	5	9.54138510	0.52403293	PARTIAL/NON SUPPORT
1701	MRW0154	South Fk Fish Ck	9/12/2006	43.45122952	-109.91378120	SEDIMENTARY MOUNTAINS	4	9.78997067	0.40858141	PARTIAL/NON SUPPORT
1891	MRW0154	South Fk Fish Ck	9/15/2009	43.45122952	-109.91378120	SEDIMENTARY MOUNTAINS	6	10.26744583	0.58437123	PARTIAL/NON SUPPORT
964	WHP24	SOUTH FORK BEAR CREEK - VOWER RANCH (SBC1)	10/28/1999	41.62373056	-104.77034722	SE PLAINS	8	8.92848508	0.89600867	FULL SUPPORT
133	MRW65	SOUTH FORK BEAVER CREEK	9/30/1996	42.44583333	-110.38305556	WYOMING BASIN	9	9.28692456	0.96910446	FULL SUPPORT
39	MRC5	SOUTH FORK CLEAR CREEK	9/20/1993	44.27388889	-106.96833333	GRANITIC MOUNTAINS	17	15.59516289	1.09008159	FULL SUPPORT
895	NGP66	South Fork Crazy Woman Creek - Above Purdy Reservo	10/26/1999	44.04223611	-106.64827778	NE PLAINS	9	8.91079143	1.01001130	FULL SUPPORT
894	NGP65	South Fork Crazy Woman Creek - Below Purdy Reservo	10/26/1999	44.04223611	-106.64827778	NE PLAINS	6	8.91213600	0.67323928	INDETERMINATE
896	NGP67	South Fork Crazy Woman Creek - Lower	10/26/1999	44.06347778	-106.60073611	NE PLAINS	9	8.91862987	1.00912361	FULL SUPPORT
897	NGP68	South Fork Crazy Woman Creek - Plains Upper	10/28/1999	43.93318889	-106.74090278	NE PLAINS	6	8.63211134	0.69507908	INDETERMINATE
1890	MRW0171	South Fork Fish Creek-Road 646	9/14/2009	43.43174193	-109.90932990	SEDIMENTARY MOUNTAINS	13	10.80423165	1.20323225	FULL SUPPORT
1892	MRW0172	South Fork Fish Creek-Union Pass Road	9/16/2009	43.46156421	-109.95924420	SEDIMENTARY MOUNTAINS	9	9.60563948	0.93694959	FULL SUPPORT
1038	SR31	South Fork Hog Park Creek-Revetments-Below FS 496	9/14/2000	41.01982778	-106.84406111	SOUTHERN ROCKIES	17	18.75458776	0.90644488	FULL SUPPORT
36	MRC37	SOUTH FORK PINEY CREEK	9/30/1996	44.55433333	-106.94287222	GRANITIC MOUNTAINS	12	14.83794632	0.80873726	INDETERMINATE
621	MRC37	SOUTH FORK PINEY CREEK	9/30/1998	44.55433333	-106.94287222	GRANITIC MOUNTAINS	14	14.83794632	0.94352680	FULL SUPPORT
901	NGP72	South Fork Powder River above I-25	10/11/1999	43.61820556	-106.57725278	NE PLAINS	2	8.92272916	0.22414667	PARTIAL/NON SUPPORT
903	NGP74	South Fork Powder River above Middle Fork Powder R	10/7/1999	43.67264444	-106.51668333	NE PLAINS	8	8.92417935	0.89644097	FULL SUPPORT
898	NGP69	South Fork Powder River above Posey Creek	10/14/1999	43.51691667	-106.63911111	NE PLAINS	5	8.92058828	0.56050115	INDETERMINATE
902	NGP73	South Fork Powder River below I-25	10/11/1999	43.63245556	-106.57050278	NE PLAINS	3	8.91851146	0.33637900	PARTIAL/NON SUPPORT
900	NGP71	South Fork Powder River below Posey Creek	10/13/1999	43.52010556	-106.64038611	NE PLAINS	3	8.92221692	0.33623930	PARTIAL/NON SUPPORT
1741	WBO287	SOUTH FORK SAGE CREEK - COWDEN	9/11/2007	42.23910405	-106.69924017	SOUTHERN FOOTHILLS & LARAMIE RANGE	9	8.92406178	1.00850938	FULL SUPPORT
723	NGP36	South Fork Shell Creek	10/21/1998	44.47359722	-106.80716944	HIGH VALLEYS	9	9.19793568	0.97848042	* FULL SUPPORT
166	MRW128	SOUTH FORK SHOSHONE RIVER - LOWER	9/19/1996	44.41000000	-109.26777778	WYOMING BASIN	7	10.04329233	0.69698260	INDETERMINATE
165	MRW127	SOUTH FORK SHOSHONE RIVER - UPPER	9/19/1996	44.20722222	-109.55527778	WYOMING BASIN	8	10.20429901	0.78398330	INDETERMINATE
1932	MRW127	SOUTH FORK SHOSHONE RIVER - UPPER	9/10/2009	44.20722222	-109.55527778	WYOMING BASIN	13	10.21071119	1.27317282	FULL SUPPORT
261	WBI19	SOUTH FORK TWIN CREEK	10/4/1995	41.80833333	-110.69555556	WYOMING BASIN	5	9.17007180	0.54525200	PARTIAL/NON SUPPORT
33	MRC32	SOUTH FORK WEST PASS CREEK	10/26/1993	44.94555556	-107.52305556	SOUTHERN ROCKIES	14	13.52168840	1.03537366	FULL SUPPORT
1650	MRC32	SOUTH FORK WEST PASS CREEK	10/24/2006	44.94555556	-107.52305556	SOUTHERN ROCKIES	15	12.62447402	1.18816831	* FULL SUPPORT
237	SR8	SOUTH FRENCH CREEK - OVERLOOK	8/29/1996	41.24250000	-106.45388889	SOUTHERN ROCKIES	21	18.03171717	1.16461454	FULL SUPPORT
1740	SR8	SOUTH FRENCH CREEK - OVERLOOK	9/6/2007	41.24266900	-106.45477500	SOUTHERN ROCKIES	21	18.27864310	1.14888178	FULL SUPPORT
1897	SR0059	SOUTH LODGEPOLE CREEK - MEADOW	6/29/2009	41.26383400	-105.31965210	SOUTHERN FOOTHILLS & LARAMIE RANGE	12	10.82527245	1.10851713	FULL SUPPORT
1916	SR0059	SOUTH LODGEPOLE CREEK - MEADOW	9/21/2009	41.26383400	-105.31965210	SOUTHERN FOOTHILLS & LARAMIE RANGE	12	10.82527245	1.10851713	FULL SUPPORT

Appendix C (cont.) – WY RIVPACS O/E values and narrative ratings for 1993-2009 samples. Asterisks designate samples that were outside model experience.

SAMPLEID	STATIONID	WATERBODY NAME	COLLECTION DATE	LAT(N)	LONG(W)	2011 BIOREGION	O	E	OE	NARRATIVE RATING
1183	MRC0116	South Paint Rock Creek	9/19/2000	44.21196900	-107.29298100	SEDIMENTARY MOUNTAINS	9	13.56555830	0.66344487	PARTIAL/NON SUPPORT
58	MRC133	SOUTH PAINTROCK CREEK	9/29/1993	44.21444444	-107.30555556	SEDIMENTARY MOUNTAINS	7	13.41062308	0.52197426	PARTIAL/NON SUPPORT
1182	MRC133	SOUTH PAINTROCK CREEK	9/19/2000	44.21444444	-107.30555556	SEDIMENTARY MOUNTAINS	8	13.59657537	0.58838346	PARTIAL/NON SUPPORT
1672	MRC133	SOUTH PAINTROCK CREEK	9/6/2006	44.21444444	-107.30555556	SEDIMENTARY MOUNTAINS	9	13.43257459	0.67001303	PARTIAL/NON SUPPORT
377	MRC134	SOUTH PAINTROCK CREEK - UPPER	9/11/1997	44.21222222	-107.30333333	SEDIMENTARY MOUNTAINS	7	12.83756661	0.54527468	PARTIAL/NON SUPPORT
1673	MRC134	SOUTH PAINTROCK CREEK - UPPER	9/7/2006	44.21222222	-107.30333333	SEDIMENTARY MOUNTAINS	9	13.39410345	0.67193747	PARTIAL/NON SUPPORT
180	MRW140	SOUTH PINEY CREEK	10/1/1996	42.50611111	-110.27777778	HIGH VALLEYS	14	12.72004601	1.10062495	FULL SUPPORT
657	MRC72	South Piney Creek - Above Willow Park Reservoir	9/30/1998	44.45150556	-107.04796667	GRANITIC MOUNTAINS	18	15.47602583	1.16308930	FULL SUPPORT
1347	WBO206	South Piney Creek-Cemetery	10/22/2003	42.50952500	-110.19503889	HIGH VALLEYS	13	12.62347438	1.02982742	FULL SUPPORT
1535	WBO206	South Piney Creek-Cemetery	10/18/2004	42.50952500	-110.19503889	HIGH VALLEYS	11	12.62152104	0.87152729	FULL SUPPORT
1868	WBO206	South Piney Creek-Cemetery	10/20/2008	42.50952500	-110.19503889	HIGH VALLEYS	10	10.28267522	0.97250956	FULL SUPPORT
658	MRC73	South Rock Creek	10/21/1998	44.45471389	-106.87862222	SOUTHERN ROCKIES	15	14.28592079	1.04998482	FULL SUPPORT
222	SR11	SOUTH SPRING CREEK-INDIAN ROCKS	9/5/1996	41.26305556	-106.95638889	SOUTHERN FOOTHILLS & LARAMIE RANGE	18	17.74936186	1.01412097	FULL SUPPORT
1689	SR11	SOUTH SPRING CREEK-INDIAN ROCKS	9/5/2006	41.26331100	-106.95582500	SOUTHERN FOOTHILLS & LARAMIE RANGE	20	17.46755025	1.14498025	FULL SUPPORT
1831	SR11	SOUTH SPRING CREEK-INDIAN ROCKS	9/24/2008	41.26331100	-106.95582500	SOUTHERN FOOTHILLS & LARAMIE RANGE	18	17.77648557	1.01257360	FULL SUPPORT
15	MRC23	SOUTH TONGUE RIVER	9/14/1993	44.76693611	-107.47208333	GRANITIC MOUNTAINS	16	14.15207570	1.13057620	FULL SUPPORT
16	MRC23	SOUTH TONGUE RIVER	8/25/1995	44.76693611	-107.47208333	GRANITIC MOUNTAINS	15	14.07461014	1.06574888	FULL SUPPORT
618	MRC23	SOUTH TONGUE RIVER	9/9/1998	44.76693611	-107.47208333	GRANITIC MOUNTAINS	16	14.02583973	1.14075166	FULL SUPPORT
1385	MRC23	SOUTH TONGUE RIVER	9/8/2003	44.76693611	-107.47208333	GRANITIC MOUNTAINS	17	14.12022555	1.20394677	FULL SUPPORT
63	MRC141	SOUTH TONGUE RIVER - LOWER	8/25/1995	44.78247222	-107.47566389	GRANITIC MOUNTAINS	13	13.47359642	0.96485004	FULL SUPPORT
674	MRC141	SOUTH TONGUE RIVER - LOWER	9/9/1998	44.78247222	-107.47566389	GRANITIC MOUNTAINS	17	13.49793114	1.25945227	FULL SUPPORT
1365	MRC141	SOUTH TONGUE RIVER - LOWER	9/5/2003	44.78247222	-107.47566389	GRANITIC MOUNTAINS	15	14.07647067	1.06560802	FULL SUPPORT
62	MRC140	SOUTH TONGUE RIVER - MIDDLE	8/24/1995	44.76916667	-107.46888889	GRANITIC MOUNTAINS	17	13.49017073	1.26017679	FULL SUPPORT
647	MRC62	South Tongue River - Upper	9/8/1998	44.68644444	-107.44615000	GRANITIC MOUNTAINS	17	14.29862772	1.18892528	FULL SUPPORT
1420	MRC62	South Tongue River - Upper	9/5/2003	44.68644444	-107.44615000	GRANITIC MOUNTAINS	18	15.44052612	1.16576339	FULL SUPPORT
992	NGP85	Spotted Horse Creek - Creswell State	9/27/2000	44.83185833	-106.01752500	NE PLAINS	1	8.92849253	0.11200099	* PARTIAL/NON SUPPORT
991	NGP84	Spotted Horse Creek Above Creswell's Diversion	9/27/2000	44.84644444	-106.04984444	NE PLAINS	3	8.92850303	0.33600257	* PARTIAL/NON SUPPORT
381	MRE13	SPOTTED TAIL CREEK	10/15/1997	44.36861111	-104.08694444	BLACK HILLS	8	9.59829172	0.83348165	INDETERMINATE
1690	WBO268	Spring Ck Bridger Hill	6/27/2006	41.64984722	-110.96653333	WYOMING BASIN	2	7.47055298	0.26771780	PARTIAL/NON SUPPORT
1325	MRW0133	Spring Creek Journeys	9/10/2002	43.46996111	-110.81278333	VOLCANIC MOUNTAINS & VALLEYS	2	9.92396049	0.20153244	PARTIAL/NON SUPPORT
1064	NGP126	Spring Creek on Reno	10/12/2000	43.53800000	-105.49800000	NE PLAINS	1	8.92376508	0.11206032	PARTIAL/NON SUPPORT
81	MRE12	STOCKADE BEAVER CREEK - LOWER	10/6/1994	43.81250000	-104.11250000	BLACK HILLS	6	10.14988352	0.59113979	* PARTIAL/NON SUPPORT
1078	MRE12	STOCKADE BEAVER CREEK - LOWER	9/19/2001	43.81250000	-104.11250000	BLACK HILLS	7	10.15273836	0.68946916	* INDETERMINATE
1674	MRE12	STOCKADE BEAVER CREEK - LOWER	8/21/2006	43.81250000	-104.11250000	BLACK HILLS	8	10.13642876	0.78923260	* INDETERMINATE
334	MRE12	STOCKADE BEAVER CREEK - MALLO CAMP	10/1/1997	44.08166667	-104.05888889	BLACK HILLS	6	9.18928843	0.65293412	INDETERMINATE
1076	MRE12	STOCKADE BEAVER CREEK - MALLO CAMP	9/17/2001	44.08166667	-104.05888889	BLACK HILLS	5	9.21407699	0.54264795	PARTIAL/NON SUPPORT
1678	MRE12	STOCKADE BEAVER CREEK - MALLO CAMP	8/24/2006	44.08166667	-104.05888889	BLACK HILLS	7	8.17058399	0.85673191	INDETERMINATE
74	MRE4	STOCKADE BEAVER CREEK - UPPER	10/19/1995	43.88722222	-104.09722222	BLACK HILLS	9	10.83628560	0.83054289	* INDETERMINATE
1077	MRE4	STOCKADE BEAVER CREEK - UPPER	9/18/2001	43.88722222	-104.09722222	BLACK HILLS	8	10.82841292	0.73879709	* INDETERMINATE
1666	MRE4	STOCKADE BEAVER CREEK - UPPER	8/23/2006	43.88722222	-104.09722222	BLACK HILLS	10	10.80414268	0.92557089	* FULL SUPPORT
1087	NGP135	Stockade Beaver Creek above Beaver Creek	9/25/2001	43.56741389	-104.14639722	NE PLAINS	5	8.92852052	0.56000319	INDETERMINATE
1677	NGP135	Stockade Beaver Creek above Beaver Creek	8/24/2006	43.56741389	-104.14639722	NE PLAINS	5	8.92854833	0.56000145	INDETERMINATE
1089	NGP137	Stockade Beaver Creek above Kinney Canyon	9/18/2001	43.91116944	-104.10676111	BLACK HILLS	5	8.92855552	0.56000100	PARTIAL/NON SUPPORT
1088	NGP136	Stockade Beaver Creek below Salt Creek	9/19/2001	43.80696111	-104.13941667	NE PLAINS	9	8.92855439	1.00800192	FULL SUPPORT
1675	NGP136	Stockade Beaver Creek below Salt Creek	8/22/2006	43.80696111	-104.13941667	NE PLAINS	3	8.92853745	0.33600128	PARTIAL/NON SUPPORT
1090	NGP139	Stockade Beaver Creek below Whoopup Creek	9/26/2001	43.63671944	-104.13305833	NE PLAINS	4	8.92854168	0.44800149	PARTIAL/NON SUPPORT
981	NGP108	Stonepile Creek Below Gillette WWTP	8/25/2000	44.26811111	-105.44113611	NE PLAINS	3	8.92337947	0.33619550	PARTIAL/NON SUPPORT
385	MRW28	STRAWBERRY CREEK	10/15/1997	42.90666667	-110.88666667	SEDIMENTARY MOUNTAINS	11	9.05570806	1.21470347	FULL SUPPORT

Appendix C (cont.) – WY RIVPACS O/E values and narrative ratings for 1993-2009 samples. Asterisks designate samples that were outside model experience.

SAMPLEID	STATIONID	WATERBODY NAME	COLLECTION DATE	LAT(N)	LONG(W)	2011 BIOREGION	O	E	OE	NARRATIVE RATING
1706	MRW28	STRAWBERRY CREEK	10/2/2006	42.90666667	-110.88666667	SEDIMENTARY MOUNTAINS	11	8.57514719	1.28277681	FULL SUPPORT
1452	WB0239	Strawberry Creek Handcart	6/30/2004	42.44446111	-108.58497778	HIGH VALLEYS	5	8.76976077	0.57014098	PARTIAL/NON SUPPORT
1878	WB0239	Strawberry Creek Handcart	6/23/2009	42.44446111	-108.58497778	HIGH VALLEYS	7	8.31549287	0.84180218	INDETERMINATE
1519	WB0240	Strawberry Creek Terminus	6/30/2004	42.42865278	-108.48197222	WYOMING BASIN	5	9.33945437	0.53536318	PARTIAL/NON SUPPORT
1879	WB0330	Strawberry Creek-Below Deep	6/24/2009	42.43446389	-108.51358160	HIGH VALLEYS	7	9.07478876	0.77136782	INDETERMINATE
789	WB51	SUBLETTE CREEK - Stouffer Road	10/14/1998	42.03605000	-110.91541111	HIGH VALLEYS	10	14.11124513	0.70865469	INDETERMINATE
1625	WB51	SUBLETTE CREEK - Stouffer Road	10/4/2005	42.03605000	-110.91541111	HIGH VALLEYS	7	14.14552076	0.49485630	PARTIAL/NON SUPPORT
659	MRC74	Sucker Creek - Lower	9/8/1998	44.72298889	-107.44583056	GRANITIC MOUNTAINS	15	14.94222414	1.00386662	FULL SUPPORT
1381	MRC74	Sucker Creek - Lower	8/27/2003	44.72298889	-107.44583056	GRANITIC MOUNTAINS	17	16.66121256	1.02033390	FULL SUPPORT
660	MRC75	Sucker Creek - Upper	9/2/1998	44.70938889	-107.41121944	GRANITIC MOUNTAINS	18	15.19444105	1.18464377	FULL SUPPORT
1380	MRC75	Sucker Creek - Upper	8/27/2003	44.70938889	-107.41121944	GRANITIC MOUNTAINS	10	16.71948604	0.59810451	PARTIAL/NON SUPPORT
949	WB98	Sulphur Creek Hwy 159 Bridge	10/20/1999	41.18322500	-110.86587222	HIGH VALLEYS	10	12.90356854	0.77497942	INDETERMINATE
1309	WB98	Sulphur Creek Hwy 159 Bridge	10/23/2002	41.18322500	-110.86587222	HIGH VALLEYS	6	13.41220941	0.44735359	PARTIAL/NON SUPPORT
1715	WB98	Sulphur Creek Hwy 159 Bridge	10/24/2006	41.18322500	-110.86587222	HIGH VALLEYS	6	12.90561760	0.46491382	PARTIAL/NON SUPPORT
948	WB97	Sulphur Creek Upper/La Chapelle	10/19/1999	41.12841111	-110.80844722	HIGH VALLEYS	7	14.04373989	0.49844273	PARTIAL/NON SUPPORT
1336	WB97	Sulphur Creek Upper/La Chapelle	10/23/2002	41.12841111	-110.80844722	HIGH VALLEYS	3	14.00833025	0.21415829	PARTIAL/NON SUPPORT
1714	WB97	Sulphur Creek Upper/La Chapelle	10/24/2006	41.12841111	-110.80844722	HIGH VALLEYS	9	14.04632150	0.64073715	PARTIAL/NON SUPPORT
1479	MRW0137	Sunlight Creek (Station 6886)	8/16/2004	44.71839167	-109.58756667	SEDIMENTARY MOUNTAINS	9	9.17423186	0.98100856	FULL SUPPORT
1082	MRW118	Sunlight Creek above Little Sunlight Creek	8/28/2001	44.71605278	-109.58837500	SEDIMENTARY MOUNTAINS	9	9.28829859	0.96896110	* FULL SUPPORT
1081	MRW119	Sunlight Creek at White Mountain	8/28/2001	44.75228333	-109.49076944	SEDIMENTARY MOUNTAINS	11	10.67089631	1.03084124	FULL SUPPORT
1604	WB0246	Sweetwater River Canyon Base	8/1/2005	42.44428056	-108.41213889	WYOMING BASIN	7	10.17953382	0.68765428	INDETERMINATE
1600	WB0247	Sweetwater River Soda	10/24/2005	42.52650833	-107.69704722	WYOMING BASIN	10	7.79017442	1.28366831	FULL SUPPORT
1605	WB0245	Sweetwater River Strawberry Confluence	8/2/2005	42.42687222	-108.47653889	WYOMING BASIN	7	9.73145594	0.71931683	INDETERMINATE
330	WB25	SWEETWATER RIVER - WILSON BAR	9/26/1997	42.40638889	-108.53361111	HIGH VALLEYS	10	11.53003551	0.86730002	FULL SUPPORT
1055	WB25	SWEETWATER RIVER - WILSON BAR	8/9/2000	42.40638889	-108.53361111	HIGH VALLEYS	8	9.62887945	0.83083396	INDETERMINATE
1227	WB25	SWEETWATER RIVER - WILSON BAR	9/4/2001	42.40638889	-108.53361111	HIGH VALLEYS	7	9.12601273	0.76703816	INDETERMINATE
1514	WB25	SWEETWATER RIVER - WILSON BAR	8/9/2000	42.40638889	-108.53361111	HIGH VALLEYS	13	11.50712512	1.12973483	FULL SUPPORT
1606	WB25	SWEETWATER RIVER - WILSON BAR	8/3/2005	42.40638889	-108.53361111	HIGH VALLEYS	6	9.81353470	0.61140050	PARTIAL/NON SUPPORT
1880	WB25	SWEETWATER RIVER - WILSON BAR	7/20/2009	42.40638889	-108.53361111	HIGH VALLEYS	7	10.47819848	0.66805377	PARTIAL/NON SUPPORT
925	WB102	Sweetwater River Lower/Haul Road	10/19/1999	42.52488333	-107.78446667	WYOMING BASIN	9	7.68997182	1.17035539	FULL SUPPORT
924	WB101	Sweetwater River Upper/Emigrant	10/19/1999	42.52128611	-107.82255556	WYOMING BASIN	11	7.67818838	1.43262961	FULL SUPPORT
1417	WB205	Sweetwater River-Pony Express	10/21/2003	42.37193333	-108.78961667	WYOMING BASIN	13	11.96454170	1.08654392	FULL SUPPORT
1536	WB205	Sweetwater River-Pony Express	10/19/2004	42.37193333	-108.78961667	WYOMING BASIN	14	11.28231375	1.24088022	FULL SUPPORT
1609	MRW0149	Swift Creek USGS Gage	8/24/2005	42.72616389	-110.89940000	SEDIMENTARY MOUNTAINS	9	9.50474602	0.94689537	FULL SUPPORT
1886	MRW0149	Swift Creek USGS Gage	8/24/2009	42.72616389	-110.89940000	SEDIMENTARY MOUNTAINS	9	9.51135091	0.94623783	FULL SUPPORT
1824	WHP0052	SYBILLE CREEK - NATWICK	9/3/2008	41.97811482	-105.07533895	SE PLAINS	10	8.92854110	1.12000380	FULL SUPPORT
6	MRC15	TENSLEEP CREEK	10/12/1993	44.14055556	-107.24638889	SEDIMENTARY MOUNTAINS	11	14.06452227	0.78210975	INDETERMINATE
1205	WB122	Tin Cup Creek Canyon	8/21/2000	42.62733333	-107.86494167	WYOMING BASIN	3	7.95637168	0.37705629	PARTIAL/NON SUPPORT
75	MRE7	TOGUS CREEK	10/3/1996	44.54416667	-104.41277778	BLACK HILLS	8	8.10126371	0.98750026	FULL SUPPORT
1762	MRE7	TOGUS CREEK	9/18/2007	44.54416667	-104.41277778	BLACK HILLS	8	8.09084611	0.98877174	FULL SUPPORT
17	MRC24	TONGUE RIVER	10/19/1993	44.84662500	-107.33068333	SEDIMENTARY MOUNTAINS	11	12.93211538	0.85059557	FULL SUPPORT
18	MRC24	TONGUE RIVER	10/20/1994	44.84662500	-107.33068333	SEDIMENTARY MOUNTAINS	11	12.87717478	0.85422464	FULL SUPPORT
19	MRC24	TONGUE RIVER	10/16/1995	44.84662500	-107.33068333	SEDIMENTARY MOUNTAINS	13	12.88352599	1.00904054	FULL SUPPORT
20	MRC24	TONGUE RIVER	9/26/1996	44.84662500	-107.33068333	SEDIMENTARY MOUNTAINS	11	12.88136137	0.85394701	FULL SUPPORT
345	MRC24	TONGUE RIVER	10/13/1997	44.84662500	-107.33068333	SEDIMENTARY MOUNTAINS	11	12.88136137	0.85394701	FULL SUPPORT
619	MRC24	TONGUE RIVER	10/13/1998	44.84662500	-107.33068333	SEDIMENTARY MOUNTAINS	14	13.38763979	1.04574071	FULL SUPPORT
828	MRC24	TONGUE RIVER	10/12/1999	44.84662500	-107.33068333	SEDIMENTARY MOUNTAINS	11	13.38580441	0.82176608	INDETERMINATE
998	MRC24	TONGUE RIVER	9/20/2000	44.84662500	-107.33068333	SEDIMENTARY MOUNTAINS	11	13.39338925	0.82130070	INDETERMINATE

Assessment of Aquatic Biological Condition Using WY RIVPACS with Comparisons to the Wyoming Stream Integrity Index (WSII)

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SAMPLEID	STATIONID	WATERBODY NAME	COLLECTION DATE	LAT(N)	LONG(W)	2011 BIOREGION	O	E	OE	NARRATIVE RATING
1122	MRC24	TONGUE RIVER	10/10/2001	44.84662500	-107.33068333	SEDIMENTARY MOUNTAINS	14	13.39338925	1.04529180	FULL SUPPORT
1293	MRC24	TONGUE RIVER	9/19/2002	44.84662500	-107.33068333	SEDIMENTARY MOUNTAINS	12	12.90688181	0.92973657	FULL SUPPORT
1388	MRC24	TONGUE RIVER	10/1/2003	44.84662500	-107.33068333	SEDIMENTARY MOUNTAINS	11	13.38949471	0.82153959	INDETERMINATE
1510	MRC24	TONGUE RIVER	10/11/2004	44.84662500	-107.33068333	SEDIMENTARY MOUNTAINS	8	12.61848769	0.63399040	PARTIAL/NON SUPPORT
1767	MRC24	TONGUE RIVER	10/10/2007	44.84662500	-107.33068333	SEDIMENTARY MOUNTAINS	13	12.88352599	1.00904054	FULL SUPPORT
1937	MRC24	TONGUE RIVER	10/15/2009	44.84662500	-107.33068333	SEDIMENTARY MOUNTAINS	14	12.88341426	1.08666847	FULL SUPPORT
724	NGP37	Tongue River - Above Dayton WWTF	10/12/1998	44.88398889	-107.23905556	HIGH VALLEYS	10	10.38420704	0.96300083	FULL SUPPORT
725	NGP38	Tongue River - Above Rancheater WWTF	10/13/1998	44.90493056	-107.14151111	HIGH VALLEYS	8	11.08649268	0.72159882	INDETERMINATE
726	NGP39	Tongue River - Below Dayton WWTF	10/12/1998	44.88291944	-107.23481944	HIGH VALLEYS	8	10.91842131	0.73270666	INDETERMINATE
727	NGP40	Tongue River - Below Rancheater WWTF	10/13/1998	44.90857778	-107.13948333	HIGH VALLEYS	8	11.02295601	0.72575814	INDETERMINATE
728	NGP41	Tongue River - Decker Highway	10/15/1998	44.94245833	-106.95067778	NE PLAINS	8	8.90686717	0.89818337	FULL SUPPORT
1511	NGP41	Tongue River - Decker Highway	10/12/2004	44.94245833	-106.95067778	NE PLAINS	7	8.91434629	0.78525107	FULL SUPPORT
203	NGPI24	TONGUE RIVER - KLEENBURN	9/12/1995	44.90649722	-107.01162778	HIGH VALLEYS	12	12.00374926	0.99968766	FULL SUPPORT
738	NGPI24	TONGUE RIVER - KLEENBURN	10/15/1998	44.90649722	-107.01162778	HIGH VALLEYS	10	11.53046782	0.86726750	FULL SUPPORT
1512	NGPI24	TONGUE RIVER - KLEENBURN	10/13/2004	44.90649722	-107.01162778	HIGH VALLEYS	8	8.89512660	0.89936887	FULL SUPPORT
215	NGPI5	TONGUE RIVER - MIDDLE	10/10/1996	44.89141944	-107.21133333	HIGH VALLEYS	10	10.42366360	0.95935560	FULL SUPPORT
349	NGPI5	TONGUE RIVER - MIDDLE	10/14/1997	44.89141944	-107.21133333	HIGH VALLEYS	9	10.43461657	0.86251372	FULL SUPPORT
757	NGPI5	TONGUE RIVER - MIDDLE	10/15/1998	44.89141944	-107.21133333	HIGH VALLEYS	9	10.96895903	0.82049718	INDETERMINATE
214	NGPI4	TONGUE RIVER - RANCHESTER	10/11/1996	44.90364444	-107.16658889	HIGH VALLEYS	12	11.09802291	1.08127367	FULL SUPPORT
350	NGPI4	TONGUE RIVER - RANCHESTER	10/14/1997	44.90364444	-107.16658889	HIGH VALLEYS	10	11.11144609	0.89997287	FULL SUPPORT
747	NGPI4	TONGUE RIVER - RANCHESTER	10/12/1998	44.90364444	-107.16658889	HIGH VALLEYS	10	11.09802291	0.90106139	FULL SUPPORT
1491	NGPI4	TONGUE RIVER - RANCHESTER	10/13/2004	44.90364444	-107.16658889	HIGH VALLEYS	8	11.10879221	0.72015030	INDETERMINATE
729	NGP42	Tongue River - State Line	10/15/1998	45.01078611	-106.83659167	NE PLAINS	8	8.91585838	0.89727760	FULL SUPPORT
1402	NGP42	Tongue River - State Line	10/22/2003	45.01078611	-106.83659167	NE PLAINS	6	8.91855867	0.67275445	INDETERMINATE
1492	NGP42	Tongue River - State Line	10/20/2004	45.01078611	-106.83659167	NE PLAINS	9	8.92081368	1.00887658	FULL SUPPORT
1490	NGP0176	Tongue River (Station 3900)	10/11/2004	44.87956111	-107.25896667	HIGH VALLEYS	11	10.39031811	1.05867788	FULL SUPPORT
1513	NGP0177	Tongue River (Station 3953)	10/21/2004	44.86678056	-107.28505000	HIGH VALLEYS	11	11.40079023	0.96484540	FULL SUPPORT
319	MRW19	TORREY CREEK - WHISKEY MOUNTAIN	9/15/1997	43.42777778	-109.55833333	SEDIMENTARY MOUNTAINS	11	11.65998136	0.94339773	FULL SUPPORT
1458	MRW19	TORREY CREEK - WHISKEY MOUNTAIN	9/14/2004	43.42777778	-109.55833333	SEDIMENTARY MOUNTAINS	14	12.27464419	1.14056259	FULL SUPPORT
1867	MRW19	TORREY CREEK - WHISKEY MOUNTAIN	9/16/2008	43.42777778	-109.55833333	SEDIMENTARY MOUNTAINS	14	10.64036567	1.31574425	FULL SUPPORT
1726	MRW0159	Trappers Creek USFS 532	10/9/2007	43.57175000	-109.89293055	GRANITIC MOUNTAINS	9	12.67906634	0.70983145	INDETERMINATE
849	MRW107	Trappers Creek Lower/Above Warm Springs Confluence	9/9/1999	43.57345000	-109.88067778	GRANITIC MOUNTAINS	13	12.23816848	1.06225045	FULL SUPPORT
1797	MRW107	Trappers Creek Lower/Above Warm Springs Confluence	10/9/2007	43.57345000	-109.88067778	GRANITIC MOUNTAINS	9	8.59826457	1.04672285	FULL SUPPORT
167	MRW129	TROUT CREEK	9/18/1996	44.48055556	-109.34361111	WYOMING BASIN	11	9.65054753	1.13983170	FULL SUPPORT
170	MRW131	TROUT CREEK	9/14/1994	44.64138889	-110.45750000	VOLCANIC MOUNTAINS & VALLEYS	2	13.14649137	0.15213185	PARTIAL/NON SUPPORT
1282	MRW131	TROUT CREEK	8/27/2002	44.64138889	-110.45750000	VOLCANIC MOUNTAINS & VALLEYS	3	13.14288061	0.22826046	PARTIAL/NON SUPPORT
1869	MRW0166	Trunk Creek Section 36	9/15/2008	43.46957770	-110.11525000	SEDIMENTARY MOUNTAINS	9	12.44698666	0.72306657	INDETERMINATE
262	WB12	TWIN CREEK	10/13/1994	41.80944444	-110.96833333	WYOMING BASIN	5	12.18440309	0.41036068	PARTIAL/NON SUPPORT
265	WB16	TWIN CREEK	9/17/1996	42.70055556	-108.49111111	WYOMING BASIN	4	6.31256382	0.63365696	PARTIAL/NON SUPPORT
1789	WB0301	Twin Creek Abv Old 287 Bridge	8/14/2007	42.69865556	-108.49170833	WYOMING BASIN	4	5.25134505	0.76170961	INDETERMINATE
1884	WB0301	Twin Creek Abv Old 287 Bridge	8/6/2009	42.69865556	-108.49170833	WYOMING BASIN	4	4.74806819	0.84244788	FULL SUPPORT
1532	WB0229	Twin Creek Gooseberry	9/21/2004	41.82467222	-110.82786389	WYOMING BASIN	5	11.97055410	0.41769161	PARTIAL/NON SUPPORT
786	WB48	TWIN CREEK - LOWER (BEAR RIVER)	9/16/1998	41.81057500	-110.98946389	WYOMING BASIN	6	12.73439252	0.47116500	PARTIAL/NON SUPPORT
787	WB49	TWIN CREEK - NUGGET (BEAR RIVER)	9/16/1998	41.82366111	-110.85387778	WYOMING BASIN	7	12.02026051	0.58235011	PARTIAL/NON SUPPORT
1459	WB49	TWIN CREEK - NUGGET (BEAR RIVER)	9/21/2004	41.82366111	-110.85387778	WYOMING BASIN	7	11.78014445	0.59422022	PARTIAL/NON SUPPORT
940	WB89	Twin Creek Red Bluff	8/24/1999	42.69276944	-108.56403333	SOUTHERN FOOTHILLS & LARAMIE RANGE	3	13.73229752	0.21846308	PARTIAL/NON SUPPORT
942	WB91	Twin Creek Section 16	8/24/1999	42.58000000	-108.55000000	HIGH VALLEYS	7	8.09596295	0.86462846	FULL SUPPORT
943	WB92	Twin Creek Section 36	8/24/1999	42.62335000	-108.49770000	SOUTHERN FOOTHILLS & LARAMIE RANGE	6	13.34296210	0.44967526	PARTIAL/NON SUPPORT

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SAMPLEID	STATIONID	WATERBODY NAME	COLLECTION DATE	LAT(N)	LONG(W)	2011 BIOREGION	O	E	OE	NARRATIVE RATING
941	WB90	Twin Creek Above Little Popo Agie	8/24/1999	42.73629444	-108.61696667	SOUTHERN FOOTHILLS & LARAMIE RANGE	4	13.84359878	0.28894221	PARTIAL/NON SUPPORT
1456	WB90	Twin Creek Above Little Popo Agie	8/19/2004	42.73629444	-108.61696667	SOUTHERN FOOTHILLS & LARAMIE RANGE	5	13.87677478	0.36031427	PARTIAL/NON SUPPORT
1720	WB90	Twin Creek Above Little Popo Agie	8/8/2007	42.73629444	-108.61696667	SOUTHERN FOOTHILLS & LARAMIE RANGE	6	13.91873817	0.43107356	PARTIAL/NON SUPPORT
1882	WB90	Twin Creek Above Little Popo Agie	8/4/2009	42.73629444	-108.61696667	SOUTHERN FOOTHILLS & LARAMIE RANGE	4	13.86313019	0.28853512	PARTIAL/NON SUPPORT
951	WBI06	Twin Creek Old 287 Crossing	8/25/1999	42.70136944	-108.49290000	WYOMING BASIN	5	13.65052220	0.36628635	PARTIAL/NON SUPPORT
1526	WBI06	Twin Creek Old 287 Crossing	8/17/2004	42.70136944	-108.49290000	WYOMING BASIN	4	13.57161265	0.29473284	PARTIAL/NON SUPPORT
1732	WBI06	Twin Creek Old 287 Crossing	8/9/2007	42.70136944	-108.49290000	WYOMING BASIN	6	13.52926064	0.44348321	PARTIAL/NON SUPPORT
1883	WBI06	Twin Creek Old 287 Crossing	8/5/2009	42.70136944	-108.49290000	WYOMING BASIN	6	13.65059359	0.43954133	PARTIAL/NON SUPPORT
788	WB50	TWIN CREEK S.FORK - UPPER (BEAR RIVER)	9/16/1998	41.80832500	-110.69616389	WYOMING BASIN	8	10.81423081	0.73976598	INDETERMINATE
850	MRW108	Unnamed Tributary to Brooks Lake	9/2/1999	43.75533611	-110.01166667	VOLCANIC MOUNTAINS & VALLEYS	14	13.60671829	1.02890349	FULL SUPPORT
1378	MRC0103	Unnamed tributary to East Fork South Tongue	8/5/2003	44.63342778	-107.42293333	GRANITIC MOUNTAINS	10	16.82405124	0.59438716	PARTIAL/NON SUPPORT
1057	MRC92	Unnamed Tributary to Little Bighorn River	9/13/2000	44.84333333	-107.75722222	SEDIMENTARY MOUNTAINS	5	12.74142428	0.39242081	PARTIAL/NON SUPPORT
1681	WB250	UNNAMED TRIBUTARY TO SAND CREEK - EAST FERRIS	8/1/2006	42.24395162	-107.11785844	WYOMING BASIN	10	10.64676354	0.93925257	FULL SUPPORT
394	WB10	UPPER MARSH CREEK	10/21/1997	41.15750000	-109.50194444	WYOMING BASIN	5	9.41581808	0.53102130	PARTIAL/NON SUPPORT
806	WB69	VERMILLION CREEK - LOWER	8/28/1998	41.00021389	-108.65420556	WYOMING BASIN	8	14.78274025	0.54117165	PARTIAL/NON SUPPORT
805	WB68	VERMILLION CREEK (UPPER)	8/28/1998	41.02169444	-108.64267222	WYOMING BASIN	8	14.68937987	0.54461115	PARTIAL/NON SUPPORT
984	MRC85	Wagon Box Creek Above Little Bighorn River	9/14/2000	44.88514167	-107.75177222	SEDIMENTARY MOUNTAINS	11	13.65156551	0.80576839	INDETERMINATE
240	SRI2	WAGONHOUND CREEK - WICK	9/11/1996	41.61305556	-106.30944444	SOUTHERN FOOTHILLS & LARAMIE RANGE	9	8.99451310	1.00061003	FULL SUPPORT
1911	SRI2	WAGONHOUND CREEK - WICK	9/14/2009	41.61305556	-106.30944444	SOUTHERN FOOTHILLS & LARAMIE RANGE	8	8.52031400	0.93893253	FULL SUPPORT
852	MRW110	Warm Springs Creek Green	9/10/1999	43.58450278	-109.91686667	GRANITIC MOUNTAINS	9	9.64381764	0.93324038	FULL SUPPORT
851	MRW109	Warm Springs Creek Upper/Above Coyote Creek	9/8/1999	43.59199722	-109.98405556	SEDIMENTARY MOUNTAINS	11	12.43059187	0.88491362	FULL SUPPORT
853	MRW111	Warm Springs Creek Fish	9/8/1999	43.58584722	-109.96773611	SEDIMENTARY MOUNTAINS	9	10.49069246	0.85790333	FULL SUPPORT
854	MRW112	Warm Springs Creek Lower/Above Trappers Creek	9/9/1999	43.57235833	-109.88076389	GRANITIC MOUNTAINS	10	8.61232204	1.16112704	FULL SUPPORT
625	MRC41	Webb Creek	9/16/1998	44.10951389	-107.11024722	GRANITIC MOUNTAINS	11	15.25426924	0.72110960	INDETERMINATE
247	SRI9	WEST FORK BATTLE CREEK	8/22/1996	41.09527778	-107.15638889	SOUTHERN FOOTHILLS & LARAMIE RANGE	13	15.43234907	0.84238634	INDETERMINATE
1124	SRI9	WEST FORK BATTLE CREEK	9/27/2001	41.09527778	-107.15638889	SOUTHERN FOOTHILLS & LARAMIE RANGE	8	15.34526261	0.52133353	PARTIAL/NON SUPPORT
1828	SRI9	WEST FORK BATTLE CREEK	9/16/2008	41.09527778	-107.15638889	SOUTHERN FOOTHILLS & LARAMIE RANGE	14	18.73012516	0.74745897	INDETERMINATE
64	MRCI42	WEST FORK BIG GOOSE CREEK - LOWER	9/16/1996	44.61198056	-107.29875556	GRANITIC MOUNTAINS	16	15.53523388	1.02991691	FULL SUPPORT
297	MRCI42	WEST FORK BIG GOOSE CREEK - LOWER	10/6/1997	44.61198056	-107.29875556	GRANITIC MOUNTAINS	15	15.41236342	0.97324463	FULL SUPPORT
675	MRCI42	WEST FORK BIG GOOSE CREEK - LOWER	9/11/1998	44.61198056	-107.29875556	GRANITIC MOUNTAINS	15	15.53523388	0.96554710	FULL SUPPORT
65	MRCI43	WEST FORK BIG GOOSE CREEK - UPPER	9/16/1996	44.61081111	-107.30042222	GRANITIC MOUNTAINS	14	15.04989311	0.93023917	FULL SUPPORT
298	MRCI43	WEST FORK BIG GOOSE CREEK - UPPER	9/17/1997	44.61081111	-107.30042222	GRANITIC MOUNTAINS	17	15.39953611	1.10392936	FULL SUPPORT
676	MRCI43	WEST FORK BIG GOOSE CREEK - UPPER	9/11/1998	44.61081111	-107.30042222	GRANITIC MOUNTAINS	18	15.04989311	1.19602178	FULL SUPPORT
243	SRI5	WEST FORK GARDEN CREEK - HILLCREST	10/15/1996	42.76333333	-106.35444444	SOUTHERN FOOTHILLS & LARAMIE RANGE	9	10.74992866	0.83721486	INDETERMINATE
1696	SRI5	WEST FORK GARDEN CREEK - HILLCREST	10/10/2006	42.76333333	-106.35444444	SOUTHERN FOOTHILLS & LARAMIE RANGE	10	10.75063594	0.93017753	FULL SUPPORT
1223	WB162	West Fork Kirby Creek - Monument Hill	9/11/2001	43.69625000	-107.89948333	WYOMING BASIN	4	4.87308937	0.82083453	FULL SUPPORT
1919	SRO066	WEST FORK LABONTE CREEK - MANNING RIDGE	9/30/2009	42.54291830	-105.52413050	NE PLAINS	7	7.40650734	0.94511484	FULL SUPPORT
1	MRC1	WEST FORK LITTLE BIGHORN RIVER	10/27/1993	44.99888889	-107.62777778	HIGH VALLEYS	4	3.46797650	1.15341035	FULL SUPPORT
360	MRW56	WEST FORK SMITHS FORK 8537	10/22/1997	41.03005000	-110.47426389	SOUTHERN ROCKIES	13	13.82085669	0.94060739	* FULL SUPPORT
687	MRW56	WEST FORK SMITHS FORK 8537	10/8/1998	41.03005000	-110.47426389	SOUTHERN ROCKIES	15	16.05265807	0.93442469	* FULL SUPPORT
859	MRW56	WEST FORK SMITHS FORK 8537	10/18/1999	41.03005000	-110.47426389	SOUTHERN ROCKIES	17	15.73702106	1.08025527	* FULL SUPPORT
1416	MRW56	WEST FORK SMITHS FORK 8537	10/15/2003	41.03005000	-110.47426389	SOUTHERN ROCKIES	14	17.40216803	0.80449746	* INDETERMINATE
989	MRC88	West Pass Creek - Lower	9/21/2000	44.98777778	-107.48222222	HIGH VALLEYS	11	12.20741117	0.90109195	FULL SUPPORT
990	MRC89	West Pass Creek at X-X Ranch	9/21/2000	44.95606111	-107.51104722	HIGH VALLEYS	11	12.42580850	0.88525427	FULL SUPPORT
7	MRC16	WEST TENSLEEP CREEK	10/12/1993	44.23861111	-107.22444444	GRANITIC MOUNTAINS	15	14.37957632	1.04314617	FULL SUPPORT
1572	MRC0108	WEST TENSLEEP CREEK	8/23/2005	44.16582500	-107.25115556	SEDIMENTARY MOUNTAINS	18	18.04246795	0.99764622	FULL SUPPORT
825	WHP109	WHEATLAND CREEK - ABOVE WHEATLAND WWTF	10/21/1998	42.08313056	-104.95088333	SE PLAINS	6	8.92855173	0.67200148	INDETERMINATE
826	WHP110	WHEATLAND CREEK - BELOW WHEATLAND WWTF	10/20/1998	42.08466667	-104.95049167	SE PLAINS	5	8.92855741	0.56000088	INDETERMINATE

Assessment of Aquatic Biological Condition Using WY RIVPACS with Comparisons to the Wyoming Stream Integrity Index (WSII)

Appendix C (cont.) – WY RIVPACS O/E values and narrative ratings for 1993-2009 samples. Asterisks designate samples that were outside model experience.

SAMPLEID	STATIONID	WATERBODY NAME	COLLECTION DATE	LAT(N)	LONG(W)	2011 BIOREGION	O	E	OE	NARRATIVE RATING
264	WB13	WHISKEY CREEK - MUDDY GAP	9/17/1996	42.36027778	-107.40000000	WYOMING BASIN	4	8.76645977	0.45628453	PARTIAL/NON SUPPORT
1475	WB13	WHISKEY CREEK - MUDDY GAP	9/14/2004	42.36238000	-107.40107000	WYOMING BASIN	4	8.78092996	0.45553262	PARTIAL/NON SUPPORT
1938	WBO326	Whistle Creek	10/22/2009	44.73002500	-108.58385800	WYOMING BASIN	6	7.86168655	0.76319502	INDETERMINATE
1101	WB143	Whistle Creek Above Shoshone River	10/15/2001	44.76820278	-108.54208611	WYOMING BASIN	5	6.01653582	0.83104300	FULL SUPPORT
78	MRE11	WHITELAW CREEK - LOWER	9/22/1993	44.50722222	-104.42055556	BLACK HILLS	9	9.60719730	0.93679767	FULL SUPPORT
79	MRE11	WHITELAW CREEK - LOWER	9/2/1994	44.50722222	-104.42055556	BLACK HILLS	9	9.59433878	0.93805318	FULL SUPPORT
80	MRE11	WHITELAW CREEK - LOWER	10/3/1996	44.50722222	-104.42055556	BLACK HILLS	10	9.58264630	1.04355307	FULL SUPPORT
1763	MRE11	WHITELAW CREEK - LOWER	9/19/2007	44.50722222	-104.42055556	BLACK HILLS	11	9.58719604	1.14736362	FULL SUPPORT
68	MRE1	WHITELAW CREEK - UPPER	9/23/1993	44.50500000	-104.43241111	BLACK HILLS	10	10.70226769	0.93438141	FULL SUPPORT
69	MRE1	WHITELAW CREEK - UPPER	9/23/1994	44.50500000	-104.43241111	BLACK HILLS	11	10.72190899	1.02593671 *	FULL SUPPORT
70	MRE1	WHITELAW CREEK - UPPER	10/18/1995	44.50500000	-104.43241111	BLACK HILLS	9	10.70226769	0.84094327	INDETERMINATE
71	MRE1	WHITELAW CREEK - UPPER	10/3/1996	44.50500000	-104.43241111	BLACK HILLS	10	10.70226769	0.93438141	FULL SUPPORT
333	MRE1	WHITELAW CREEK - UPPER	10/1/1997	44.50500000	-104.43241111	BLACK HILLS	10	10.70226769	0.93438141	FULL SUPPORT
679	MRE1	WHITELAW CREEK - UPPER	9/10/1998	44.50500000	-104.43241111	BLACK HILLS	11	10.18768742	1.07973474	FULL SUPPORT
840	MRE1	WHITELAW CREEK - UPPER	10/8/1999	44.50500000	-104.43241111	BLACK HILLS	10	10.17591227	0.98271287	FULL SUPPORT
1030	MRE1	WHITELAW CREEK - UPPER	10/19/2000	44.50500000	-104.43241111	BLACK HILLS	7	9.61007860	0.72840195	INDETERMINATE
1067	MRE1	WHITELAW CREEK - UPPER	10/2/2001	44.50500000	-104.43241111	BLACK HILLS	9	10.11826061	0.98831216	FULL SUPPORT
1256	MRE1	WHITELAW CREEK - UPPER	10/2/2002	44.50500000	-104.43241111	BLACK HILLS	10	10.70041216	0.84108910	INDETERMINATE
1760	MRE1	WHITELAW CREEK - UPPER	9/17/2007	44.50500000	-104.43241111	BLACK HILLS	11	10.19267614	1.07920627	FULL SUPPORT
318	MRW49	WIGGINS FORK - THUNDERHEAD	9/15/1997	43.55638889	-109.47666667	HIGH VALLEYS	11	11.18659803	0.98331950	FULL SUPPORT
1531	MRW49	WIGGINS FORK - THUNDERHEAD	9/15/2004	43.55638889	-109.47666667	HIGH VALLEYS	14	11.14169826	1.25654094	FULL SUPPORT
355	MRW26	WILLOW CREEK	10/16/1997	42.84500000	-110.87888889	SEDIMENTARY MOUNTAINS	10	8.05005985	1.24222679	FULL SUPPORT
366	MRW54	WILLOW CREEK	10/22/1997	41.11222222	-110.46694444	HIGH VALLEYS	13	11.82496881	1.09936865	FULL SUPPORT
1707	MRW26	WILLOW CREEK	10/3/2006	42.84500000	-110.87888889	SEDIMENTARY MOUNTAINS	12	9.13455836	1.31369241	FULL SUPPORT
91	MRW13	WILLOW CREEK Sourdough	9/1/1994	43.29138889	-110.67166667	SEDIMENTARY MOUNTAINS	10	10.00433696	0.99956649	FULL SUPPORT
1324	MRW13	WILLOW CREEK Sourdough	9/9/2002	43.29138889	-110.67166667	SEDIMENTARY MOUNTAINS	11	10.01258122	1.09861780	FULL SUPPORT
1603	WBO244	Willow Creek Cow Camp	7/20/2005	42.41397222	-108.42125556	WYOMING BASIN	9	9.03243507	0.99640905	FULL SUPPORT
1206	WB123	Willow Creek Henry Peak	8/22/2000	42.36150000	-107.59634722	WYOMING BASIN	9	6.04621357	1.48853492	FULL SUPPORT
1602	WBO243	Willow Creek WSA	7/19/2005	42.42006944	-108.42751389	WYOMING BASIN	10	8.43963036	1.18488602	FULL SUPPORT
931	WB80	Willow Creek Lower (287)	10/25/1999	42.75360833	-108.65374444	HIGH VALLEYS	6	9.24708144	0.64885338	PARTIAL/NON SUPPORT
1404	WB201	Willow Creek - Road Crossing	8/5/2003	41.11296667	-110.46715278	HIGH VALLEYS	10	11.61207415	0.86117259	FULL SUPPORT
932	WB81	Willow Creek Upper (Day) Above Beason	10/27/1999	42.72215278	-108.70733611	HIGH VALLEYS	6	7.58179339	0.79136949	INDETERMINATE
844	MRW102	Willow Creek Upper (RR Crossing)	8/4/1999	42.47286111	-108.81522222	HIGH VALLEYS	8	9.39533818	0.85148611	INDETERMINATE
1403	WB202	Willow Creek - Yellow Hollow	8/5/2003	41.14259444	-110.44776389	HIGH VALLEYS	9	11.87507633	0.75788987	INDETERMINATE
933	WB82	Willow Creek Middle (Sacher, Blue Hill)	10/26/1999	42.73520000	-108.68189444	HIGH VALLEYS	5	8.68942188	0.57541227	PARTIAL/NON SUPPORT
845	MRW103	Willow Creek Middle -Shields Mine	8/5/1999	42.46330278	-108.78414722	HIGH VALLEYS	9	9.59416127	1.04230060	FULL SUPPORT
1405	WU0003	Willow Creek-Springs	8/6/2003	41.06793611	-110.50493889	HIGH VALLEYS	10	13.22027368	0.75641399 *	INDETERMINATE
848	MRW106	Wind River BLM	9/22/1999	43.60637500	-109.80206389	HIGH VALLEYS	13	12.84253267	1.01226139	FULL SUPPORT
1224	WB163	Wind River - Boysen	9/18/2001	43.16651944	-108.19496667	WYOMING BASIN	8	8.42812618	0.94920268	FULL SUPPORT
945	WB94	Wind River Dubois	9/23/1999	43.53974444	-109.65515833	HIGH VALLEYS	6	9.20897006	0.65153866	PARTIAL/NON SUPPORT
946	WB95	Wind River Fish Access	9/30/1999	43.48119444	-109.49869444	HIGH VALLEYS	12	12.59513170	0.95274907	FULL SUPPORT
944	WB93	Wind River Jakey's Fork	9/29/1999	43.51920000	-109.56702778	HIGH VALLEYS	11	12.09097660	0.90976936	FULL SUPPORT
947	WB96	Wind River Schwinn/287 Crossing	10/1/1999	43.44198333	-109.46164167	HIGH VALLEYS	10	12.16280222	0.82217895	INDETERMINATE
847	MRW105	Wind River Stoney Point	9/23/1999	43.59121667	-109.77480833	HIGH VALLEYS	13	12.40392606	1.04805526	FULL SUPPORT
1225	WB164	Wind River- Neble Hill	9/19/2001	43.12150833	-108.25587778	WYOMING BASIN	7	8.50542004	0.82300462	FULL SUPPORT
846	MRW104	Wind River USFS	9/24/1999	43.62967778	-109.88528889	HIGH VALLEYS	12	11.65219933	1.02984850	FULL SUPPORT
204	NGPI25	WOLF CREEK	10/25/1995	44.84250000	-107.18916667	HIGH VALLEYS	11	9.62547086	1.14280124	FULL SUPPORT
1369	NGPI25	WOLF CREEK	10/8/2003	44.84250000	-107.18916667	HIGH VALLEYS	9	9.63648863	0.93395015	FULL SUPPORT

Appendix C (cont.) – WY RIVPACS O/E values and narrative ratings for 1993-2009 samples. Asterisks designate samples that were outside model experience.

SAMPLEID	STATIONID	WATERBODY NAME	COLLECTION DATE	LAT(N)	LONG(W)	2011 BIOREGION	O	E	OE	NARRATIVE RATING
216	NGPI6	WOLF CREEK - LOWER	10/10/1996	44.89833333	-107.17166667	HIGH VALLEYS	9	10.35340515	0.86927922	FULL SUPPORT
344	NGPI6	WOLF CREEK - LOWER	10/10/1997	44.89833333	-107.17166667	HIGH VALLEYS	11	10.75063619	1.02319526	FULL SUPPORT
1406	WB203	Yellow Creek-Sulphur Hollow	8/12/2003	41.22976944	-111.00930000	WYOMING BASIN	4	12.12178128	0.32998451	PARTIAL/NON SUPPORT