

Development of Idaho Macroinvertebrate Temperature Occurrence Models

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Data collected from 1993-2000 for the Idaho DEQ BURP program were analyzed by Brandt (2001) to determine preferred temperature ranges for individual BMI taxa (Brandt 2001). In this study we evaluated BMI and temperature data collected from 2003 to 2010. The database consisted of a total of 221,240 macroinvertebrate abundance counts and 6151 instantaneous temperature records. Since the database spanned 18 years, taxonomic names were standardized to reflect current taxonomy nomenclature. Of all taxa in the database 453 taxa had at least 20 records of occurrence and were selected for evaluation. Empirical cumulative distribution functions, vertical boxplots, and descriptive statistics were used to evaluate taxa response to temperature. IDEQ biologists suggested a cold-water indicator threshold of any taxon whose 90th percentile limit was less than 20°C. Of the 453 taxa we analyzed, 258 met this cold-water indicator criterion. Temperature ranges for all taxa were then placed into three categories taxa whose: 1st to 3rd quartiles were < 13°C (the mean temperature recorded at all sites in the database); 2) 1st to 3rd quartiles were > 13°C; 3) 1st to 3rd quartiles spanned 13°C. Fifty nine taxa were found to be in the first category and are likely to be obligate cold water taxa and 127 were in category two and are likely warm water obligate taxa. Taxa that were in category three may be considered “seasonally cold” or possibly “cool water” taxa. Many of these individual taxa classifications are confirmed by experienced regional biologists; however, some chironomids, a beetle and an aquatic mite are newly added to the regional knowledge base of cold-water obligate taxa.