

In-Stream Monitoring Provisions for Resource Extraction Individual Permits in Coldwater Aquatic Habitats

Coldwater Aquatic Habitats (CAHs) are those surface waters and associated substrate that are able to support indigenous aquatic life or self-sustaining or reproducing trout populations on a year-round basis. As designated by the Energy and Environment Cabinet pursuant to 401 KAR 10:031, Section 4 Subsection 2, the following parameters and criteria are for the protection of productive coldwater aquatic communities and streams that support trout populations, whether self-sustaining or reproducing, on a year-round basis. The criteria adopted for the protection of warm water aquatic life also apply to the protection of coldwater habitats with the following additions:

(a) Dissolved oxygen.

1. A minimum concentration of six and zero-tenths (6.0) mg/l as a twenty-four (24) hour average and five and zero-tenths (5.0) mg/l as an instantaneous minimum shall be maintained.

2. In lakes and reservoirs that support trout, the concentration of dissolved oxygen in waters below the epilimnion shall be kept consistent with natural water quality; and

(b) Temperature. Water temperature shall not be increased through human activities above the natural seasonal temperatures.

Provisions for CAH StreamsError! Bookmark not defined.

- 1) A one year, pre-mining biological community assessment and semi-monthly physicochemical sampling is required for all permits involving CAHs before any land disturbance has occurred.
- 2) Prior to onset of sampling, a comprehensive study plan shall be submitted to and approved by KDOW. **This study plan must have all the requirements listed in the Quality Assurance Project Plan application (KDOW 2010).** Copies of KDFWR collecting permits shall be included with the study plan.
- 3) No in-stream disturbances shall occur in the main-stem or in any biologically important tributaries of the CAH as delineated by the U.S.G.S 7.5 minute Quadrangle Map unless approved by the KDOW.
- 4) A 100-foot buffer zone shall be maintained for each stream including tributary streams. Width variances of the buffer zone may be granted on a case-by-case basis.
- 5) All underground mining within the immediate watershed of a CAH shall adhere to

a 150-foot minimum subsidence zone buffer so that no stream will be impacted by loss of flow and/or habitat disturbance.

- 6) In-stream, physico-chemical parameters for pre-resource extraction and active resource extraction monitoring provisions are listed in the table below:

Characteristic	Minimum	Average	Maximum	Sample Type
Flow (cfs)		Report	Report	Instantaneous
Dissolved Oxygen (mg/L)		Report	Report	Grab
Temperature (⁰ F)		Report	Report	Grab
Conductivity (μS/cm)		Report	Report	Grab
Alkalinity (as mg/l CaCO ₃)		Report	Report	Grab
pH (standard units)	Report		Report	Grab
TDS (mg/l)		Report	Report	Grab
Sulfates (as mg/l SO ₄)		Report	Report	Grab
Chlorides (mg/l)		Report	Report	Grab
Total Calcium (μg/l)		Report	Report	Grab
Total Magnesium (μg/l)		Report	Report	Grab
Total Sodium (μg/l)		Report	Report	Grab
Total Potassium (μg/l)		Report	Report	Grab
Antimony (μg/l)		Report	Report	Grab
Arsenic (μg/l)		Report	Report	Grab
Cadmium (μg/l)		Report	Report	Grab
Copper (μg/l)		Report	Report	Grab
Iron (μg/l)		Report	Report	Grab
Lead (μg/l)		Report	Report	Grab
Manganese (μg/l)		Report	Report	Grab
Mercury (μg/l)		Report	Report	Grab
Nickel (μg/l)		Report	Report	Grab
Selenium (μg/l)		Report	Report	Grab

Characteristic	Minimum	Average	Maximum	Sample Type
Thallium (µg/l)		Report	Report	Grab
Total Settleable Solids (µg/l)		Report	Report	Grab
Total Suspended Solids (µg/l)		Report	Report	Grab
Zinc (µg/l)		Report	Report	Grab
Hardness (as mg/l CaCO ₃)		Report	Report	Grab

Water quality sampling sites shall be established on the main-stem between each tributary that shall be affected by the proposed project. A control site shall be included above all disturbances in the watershed. Each tributary shall also be monitored for water quality parameters. These sampling sites shall coincide with the aquatic macroinvertebrate sites which shall be required. At least one of these sampling events shall be conducted during a rainfall event (> 1 inch of rain within a 24 hour period).

One Year, Pre-Mining Monitoring Program Requirements

- 1) Water Chemistry Characterization (every two weeks)
- 2) Habitat Assessment
- 3) Macroinvertebrate Community Assessment
- 4) Fish Community Assessment
- 5) Stream Substrate and Sediment Transport Analysis
- 6) 24 Hour Temperature and Conductivity Baseline Curves

Continual Monitoring Program Requirements – through Phase 2 bond release

- 1) Water Chemistry Characterization (monthly)
- 2) Habitat Assessment (yearly)
- 3) Macroinvertebrate Community Assessment (yearly)
- 4) Fish Community Assessment (yearly)
- 5) Stream Substrate and Sediment Transport Analysis (yearly)

Data Reporting Provisions:

- 1) All quarterly reports shall be submitted to the Division of Water by the end of each quarter.
- 2) All quarterly reports will be compiled into a final calendar year report. The final year report shall be submitted to the Division of Water no later than February 15th of the following year.
- 3) All final reports will contain a yearly and seasonal comparison of all past reported data. This comparison will include but not limited to water quality data, macroinvertebrate metric assessments and fish IBI scores and assessments.
- 4) All stations will be identified by latitude and longitude in decimal degrees. Mile points will also be given for each station.
- 5) The metrics that will be used to determine stream health will include but will not be limited the following metrics for macroinvertebrates: Taxa richness; Total Number of Individuals; EPT; m%EPT; mHBI; %Ephemeroptera; %Clingers; and %Chironomidae+Oligochaeta.

For macroinvertebrates: calculation of the Macroinvertebrate Bioassessment Index (MBI) will be included in the report. The MBI template to be used is located in this website.

For Fish: Index of Biotic Integrity (IBI) based on Kentucky Division of Water assessments and re-evaluations. The KIBI template to be used is located on this website.

- 6) A CD in an Excel Spreadsheet format shall be included with the aforementioned yearly report with all past pre-resource extraction sampling data included with the current sampling year's data. Subsequent data CD's will include only the current sampling year. Data that shall be included but not limited to: Date of sampling; Time of sampling; Station ID, Number and all pertinent site information; Sampler ID; Method of sampling; Macroinvertebrates, fish, and water quality data in separate files and associated metrics with each site; and habitat information sheets.
- 7) Examples of data analysis can be found in the following: ***Methods for Conducting Resource Extraction Intensive Surveys in Coldwater Aquatic Habitats.***

Required Standard Operating Procedures for Intensive Surveys:

See: *Methods for Conducting Resource Extraction Intensive Surveys in Coldwater Aquatic Habitats.*

REFERENCES

Kentucky Division of Water. 2010. Quality Assurance Project Plan Individual Coal Mining Permits - Focus Monitoring for Water Quality, Biological Communities and Habitat Conditions.