

Higgins Run
Environmental Analysis
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This study was done for Mountain Laurel Trout Unlimited and the Southern Alleghenies Conservancy. It is part of a comprehensive study and evaluation by Macri International on Higgins Run. Interested parties should contact:

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Findings and Conclusions

This environmental analysis represents the findings and conclusions by Macri International, Environmental Consultants, Waynesboro Pennsylvania. Higgins Run was studied and analyzed by chief scientist and director, Eugene P. Macri Jr. in 2003 and 2004. I would also like to thank Lenny Lichvar of Southern Alleghenies Conservancy, Bob Wardrop, Bob Reath, and Bob Ritchey of Mountain Laurel Trout Unlimited for their help. Also, Becky Buchanan and Ben Lorson who worked as interns for a day on the stream. Special thanks to Carl Jones of the Somerset County Conservation District who worked with me many days on Higgins Run. I would also like to thank the DEP, PFBC and Genesis Inc. for data and maps they sent me.

This stream was successfully benchmarked chemical and biologically. Because of the baseline established it is now possible to show the effects of what has occurred due to recent perturbations.

*Higgins Run has the potential to be a large wild brown trout nursery to the Quemahoning Reservoir. Large trout swim up the stream to spawn and there is also a resident population according to data furnished by PFBC. A stream must have a number of things to serve as nursery and a wild brown trout stream. Higgins Run has these things but also has serious threats to its sustainability as a productive ecosystem.

*Benthic Data: The stream has a good EPT Ratio: Ephemeroptera (Mayflies), Plecoptera (Stoneflies), and Trichoptera (Caddisflies). This ratio is one of the standard metrics used to judge streams by aquatic scientists. Other metrics also show high scores (see Benthic Studies). The section of the stream above the boreholes, HR1 has the most diversity and the most mayflies. Mayfly populations decrease below the boreholes because many species are more sensitive to acid waters and metals. Some stonefly and caddisfly populations are good below the boreholes because they can withstand the changing acid conditions and metals. There are decreasing populations of most invertebrates in early 2004 throughout the stream due to chemical inputs of road salt I believe. I do not have direct proof but larger instars were missing this year, and I have seen this before in other streams with salt problems. Also, changing chemical conditions of the boreholes may also limit growth patterns of some invertebrates.

*The water chemistry previously discussed in the chemical analysis shows wild swings in pH and metals in the stream. pH controls “the immune system” of the stream because it controls all chemical and biological systems in the ecosystem. In January 2004 the lower part of the stream was wiped out by seepage from Genesis Solar 7. In April 2004 the acid input of the boreholes from Genesis #17 destroyed the stream below HR1 from acidification and precipitation of metals on the stream substrate.

Now Higgins Run is nearly lifeless and the substrate shows the remains of the disasters which have occurred. Can the stream be brought back to life and how can it be done? I believe the answer is yes but I don't believe the approaches used in the past by the state of Pennsylvania will work here. There is little data to show that they have been successful by allowing the streams to come back naturally.

I recommend the following:

- *Continued monitoring of chemical parameters of the stream. Increasing the parameters being monitored to include zinc, arsenic and others. A 24 hour pH data logger at the 6 sites.

- *Continued benthic studies with comparison analysis of water chemistry and previous benthic studies.

- *Seepage below HR5 must be stopped or contained.

- *The extreme acid output of the boreholes must be stopped.

- *In my studies over the years I have found that the pH of the stream must be brought to around 6.4 and stay there for a good recovery to occur.

- *Artificial Substrate studies must be used to assess the damage to the substrate from the metal oxides deposited. The stream will not come back if left to its own because of these problems (minimum 3 year studies). These findings should be compared to normal benthic samplings and past benchmarking of the stream.

- *Once the artificial substrates show that the stream can recover if the substrate is clear of the contamination, physical stream improvement in one section should be tried. If this proves successful then stream substrates must be mechanically removed and rebuilt throughout. This would also be a good time to implement some type of stream improvement such as Rosgen.

- *This stream could serve as an AMD model throughout the state in bringing back streams that have been hit by acid mine inputs.

Conclusion: I believe there must be an aggressive approach taken in order to bring Higgins Run back. Scientific studies have shown that remediation has to focus all aspects of the ecosystem because the effects of AMD are synergistic. The metal oxides affect not only fish and macroinvertebrates but also the primary producers which affect all trophic levels.

