APPENDIX D

Integrated Aquatic Life Use Evaluation Tables

Note: Site names and accompanying headings in red font indicate sites that are impaired for aquatic life uses.

Upper Hocking River WAU:0503020-010					
Hocking River (01-001)	**Aquatic Life Use**		**Indicators**	**Leading Causes/Sources of Aquatic Life use Impairment**	**Other Beneficial Uses/Tiers**
	Existing	**Rec.**			
RM 101.0-73.4 **Attainment** **Full:** 18.6 miles **Partial:** 5.3 miles **Non:** 3.7 miles **Length:** 27.6	WWH and MWH	WWH and MWH	NON Attainment (WWH) **Headwaters: RM 100.2** -Fair Fish/Inverts. -Poor QHEI (41.0) -DO (5.5-7.5, mean 7.3) -NO_3-N (highly elevated) -TKN (>background) -NH_3-N (~elevated) -TP (~background) -BOD_5 (highly elevated) -COD_5 (<background) -F.coliform (1 PCR excdc. 35,000) PARTIAL Attainment (WWH) **US 33, Dst. Lancaster: RM 87.3** -Fair Fish/Good Inverts. -WWH QHEI (65.0) -DO (6.3-11.0, mean 7.6) -NO_3-N (highly elevated) -NH_3-N (highly elevated) -TKN (highly elevated) -TP (elevated) -BOD_5 (highly elevated) -COD_5 (background) -F.Coliform (3 PCR exceedences, max 45,000)	**RM 100.2** (3.7 miles) **Cause(s)**: Direct Habitat Alterations, Sedimentation (silt), Nutrient Enrichment, and DO/Organic Enrichment. **Source(s)**:Channelization (ag), Agriculture (row crop), and Riparian Removal/Encroachment (ag) **RM 87.3** (5.3 miles) **Cause(s)**: DO/Organic Enrichment, and Nutrient Enrichment **Source(s)**: Major POTW (Lancaster) and possibly CSOs.	**Recreational Use** PCR, verified **Anti-Degregadation** **E and T species** none **Declining Species** L. Br. Lamprey (7) Rosyface Sh. (111) **Vunerability** Low **BioNarrative** Good **QHEI** >80 (10%) 80-70 (40%) ≤70 (60%) **Sensitive species** 12 Species 179.6/0.3km (20%) **Multiple Attributes** Moderate ***Recommended Tier*:** GHQW Note: Possible SHQW candidate (RM 82.0-73.4)

Comments: Use impairment limited to two discrete, and relatively small, segments: headwaters (RM 100.2-97.3) and a reach downstream from the Lancaster WWTP (RM 87.3-82.0). All other segments found to contain fish and benthic macroinvertebrate communities consistent with applicable biocriteria.

Headwaters (NON):
Aquatic life use impairment within the extreme headwaters of the Hocking River was associated with agricultural drainage and attendant environmental problems. Channel geometry was highly artificial, and obviously directly modified in the past. Deeply incised (to expedite drainage), the channel was monotonous, offering very limited habitat for aquatic life. Substrates were predominantly fine clayey silts. Riparian vegetation was limited, or where present, consisted of a narrow band of old field species. Chemical and ambient biological measures were in full agreement regarding the effects of channelization, sedimentation and nutrient enrichment.

Downstream Lancaster (PARTIAL):
The aquatic life use impairment derived from Lancaster WWTP was reduced in comparison to all previous assessments and was manifest for two miles downstream from the POTW. Associated causes and sources of impacted biological communities included the elevated to highly elevated nutrients (nitrates and TP). The stimulatory effects of excess nutrients were evident in a highly variable DO regime and elevated BOD. Other parameters indicating the influence of the Lancaster WWTP included elevated TKN, Fecal coliform, and ammonia-N. The later did not reach toxic levels, but likely served as an additional source of available nitrogen once oxidized in-stream. Possible effects of a small impoundment on the Hocking River formed by a culverted ford a small distance downstream from RM 87.3 appeared at most tertiary, serving *possibly* to attenuate flow and entrained pollutants, thus amplifying their negative effects.

Trends

As predicted in the prior assessment (Ohio EPA, 1995), the benthic macroinvertebrate community improved throughout the previously impaired segment flowing through and draining the greater Lancaster area (including areas affected by CSOs and the POTW). Fish communities indicated improvement as well, but at this point appear limited, as predicted, by physical habitat through the MWH designated segment contained within the established urban areas of Lancaster. As stated above, the current influence of the WWTP and previous impacts associated with CSOs, are nearly abated, as Aquatic Life Use impairment is now modest (Partial attainment) and limited to a 5.3 mile segment beginning approximately two miles downstream from the Lancaster WWTP outfall. It is important to contrast the present conditions of the Hocking River with the profound nature of the degradation documented in the early 1980s. By any measure the sweeping positive changes in the environmental conditions of the Hocking are unparalleled in Ohio.

Claypool Run (01-054)	**Aquatic Life Use**		**Indicators**	**Leading Causes/Sources of Aquatic Life use Impairment**	**Other Beneficial Uses/Tiers**
	Existing	**Rec.**			
Attainment **Full:** 1.0 miles **Partial:** 0.0 miles **Non:** 0.0 miles **Length:** 1.0	Unlisted	WWH	FULL Attainment	NA	**Recreational Use** Reach found to contain adequate pool depth and area, PCR use is recommended. **Anti-Degregadation** **E and T species** none **Declining Species** none **Vunerability** High **BioNarrative** M.Good **QHEI** >80 (0) 80-70 (0) ≤70 (100%) **Multiple Attributes** Low ***Recommended Tier*:** GHQW
Comments: Reach evaluated found to contain fish and benthic macroinvertebrate communities consistent with applicable biocriteria.					

Hunters Run (01-048)	**Aquatic Life Use**		**Indicators**	**Leading Causes/Sources of Aquatic Life use Impairment**	**Other Beneficial Uses/Tiers**
	Existing	**Rec.**			
Attainment **Full:** 5.0 miles **Partial:** 0.0 miles **Non:** 0.0 miles	WWH+	WWH	FULL Attainment	NA	**Recreational Use** PCR, verified **Anti-Degregadation** **E and T species** none

Length: 5.0					**Declining Species** none **Vunerability** High **BioNarrative** Good **QHEI** >80 (0) 80-70 (0) ≤70 (100%) **Multiple Attributes** Low ***Recommended Tier*:** GHQW
Comments: Reach evaluated found to contain fish and benthic macroinvertebrate communities consistent with applicable biocriteria.					
Baldwin Run (01-046)	**Aquatic Life Use**		**Indicators**	**Leading Causes/Sources of Aquatic Life use Impairment**	**Other Beneficial Uses/Tiers**
	Existing	**Rec.**			
Attainment **Full:** 3.0 miles **Partial:** 0.0 miles **Non:** 0.0 miles **Length:** 3.0	WWH+	WWH	FULL Attainment	NA	**Recreational Use** PCR, verified **Anti-Degregadation** **E and T species** none **Declining Species** S.R.B. Dace (78) **Vunerability** High **BioNarrative** Good/M Good **QHEI** >80 (0) 80-70 (0) ≤70 (100%) **Multiple Attributes** Low ***Recommended Tier:*** GHQW
Comments: Reach evaluated found to contain fish and benthic macroinvertebrate communities consistent with applicable biocriteria.					
Fetters Run (01-047)	**Aquatic Life Use**		**Indicators**	**Leading Causes/Sources of Aquatic Life use Impairment**	**Other Beneficial Uses/Tiers**
	Existing	**Rec.**			
Attainment **Full:** 3.0 miles **Partial:** 0.0 miles **Non:** 0.0 miles **Length:** 3.0	WWH*	WWH	FULL Attainment	NA	**Recreational Use** Reach found to contain adequate pool depth and area, PCR use is recommended. **Anti-Degregadation** **E and T species**

					none **Declining Species** S.R.B. Dace (21) **Vunerability** High **BioNarrative** Good **QHEI** >80 (0) 80-70 (0) ≤70 (100%) **Multiple Attributes** Low ***Recommended Tier*:** GHQW
Comments: Reach evaluated found to contain fish and benthic macroinvertebrate communities consistent with applicable biocriteria.					
Pleasant Run (01-045)	**Aquatic Life Use**		**Indicators**	**Leading Causes/Sources of Aquatic Life use Impairment**	**Other Beneficial Uses/Tiers**
	Existing	**Rec.**			
Attainment **Full:** 9.0 miles **Partial:** 0.0 miles **Non:** 0.0 miles **Length:** 9.0	WWH*	WWH	FULL Attainment	NA	**Recreational Use** Reach found to contain adequate pool depth and area, PCR use is recommended. **Anti-Degregadation** **E and T species** none **Declining Species** Horneyhead Ch (6) River Chub (3) Rosyface Sh (6) S.R.B. Dace (33) **Vunerability** High **BioNarrative** V Good/Good **QHEI** >80 (0) 80-70 (0) ≤70 (100%) **Sensitive Species** 8 Species 170/0.3km (12%) **Multiple Attributes** Moderate ***Recommended Tier*:** SHQW (Entire length)

Comments: Reach evaluated found to contain fish and benthic macroinvertebrate communities consistent with applicable biocriteria.					
UN Hocking Trib.@ RM 84.38 (01-064)	**Aquatic Life Use**		**Indicators**	**Leading Causes/Sources of Aquatic Life use Impairment**	**Other Beneficial Uses/Tiers**
	Existing	**Rec.**			
Attainment **Full:** 1.0 miles **Partial:** 0.0 miles **Non:** 0.0 miles **Length:** 1.0	Unlisted	WWH	Full attainment (2006) -see 2006 Addendum PARTIAL Attainment (2004) -Fair Fish and Fair Bugs -Poor QHEI (46.0) -DO (5.6-6.6, mean 6.2) -NO_3-N (elevated) -NO_2-N (**>** background, mean 0.06 max=0.11) -NH_3-N (highly elevated, max 1.2) -TKN (elevated) -Field Condct. (extremely elevated, max 9200) -F. coliform (all values> PRC, 2200-5300 No/100ml)	**2006** NA **2004** **Cause(s)**: Direct Habitat Alteration, Siltaion (silt), possible HN_3-N and NO_2-N toxicity **Source(s)**:Channelization (ag), Agriculture (silt, drainage, and nitrogen) and Onsite Wastewater Systems (nitrogen and fecal coliform) and/or Undocumented Spill/Release (ag, US 33 construction?), and Unknown	**Recreational Use** Although reach lacked adequate pool depth and area, private residence adjacent. As such, PCR is Recommended. **Anti-Degregadation** **E and T species** none **Declining Species** none **Vunerability** High **BioNarrative** Good **QHEI** >80 (0) 80-70 (0) ≤70 (100%) **Multiple Attributes** Low ***Recommended Tier*:** GHQW
Comments: Adjacent property owner stated that the stream has not been modified for many years. Water body is not likely petitioned or maintained as defined under Ohio Drainage Law. As such, stream may not be eligible for MWH designation. Impacts to biology and WQ appeared associated with previous channelization, siltation, row crop agriculture, failing septic systems and/or other unknown pollution sources/spills. Nitrite-N is rapidly oxidized in nature and thus ambient concentrations are typically very low. Water chemistry analysis revealed highly elevated nitrite-N in this small unnamed Hocking River tributary. Where observed, anomalously high nitrite values are typically associated with reduced (anoxic) conditions or areas that receive an inordinate nitrogen load, or a combination of both scenarios. Elevated concentrations of ammonia-N and numerous exceedences of the PCR max F. coliform criterion were also observed, and suggested failing septic systems as a possible source. Lastly Field measurements of specific conductance were very anomalous (extremely elevated) with values as high as 9200 umohs/cm observed. Numerous potential pollution sources exist in adjacent areas and it is difficult to specifically identify the principal stressor(s). These would include, but not limited to, over application nutrients (particularly ammonia) on adjacent agricultural fields, failing on-site home septic systems, agricultural spill or release, or possibly a spill event(s) associated with on-going US 33 construction. Regardless of the ultimate source(s) of the excess nitrogen (and other odd findings), the natural assimilation of nutrient inputs was limited by simple physical habitat. Thus, aquatic				

life use impairment of this water body was most likely a result of the combined influences of marginal macrohabitat quality and impacted chemical water quality.

2006 Addendum
As the suspected impacts documented in 2004 may have been associated with US 33 Lancaster bypass construction, and thus temporal in nature, additional sampling was directed to this tributary in 2006. Unfortunately, no chemistry or macroinvertebrate work was done, but the fish community was re-evaluated. The results from this effort found the fish community in full agreement with the recommended WWH aquatic life use. These results suggest that the impairment documented in 2004, was indeed ephemeral and very likely a result of the US 33 construction and supporting activities.

UN Hocking Trib @ RM 82.57 (01-063)	**Aquatic Life Use**		**Indicators**	**Leading Causes/Sources of Aquatic Life use Impairment**	**Other Beneficial Uses/Tiers**
	Existing	**Rec.**			
Attainment **Full:** 0.0 miles **Partial:** 2.0 miles **Non:** 0.0 miles **Length:** 2.0	Unlisted	WWH	PARTIAL Attainment -Fair Fish and Good Bugs - Marginal QHEI (54.0) - DO regime depressed, although no violations or exceedences - Three of five samples found Fecal coliform in excess of PRC	**Cause(s)**: Direct Habitat Alterations, and Sedimentation (sand bedload, shifting and unstable) **Source(s)**: Channelization, Agriculture(row crop), Natural (sand), and Riparian Removal/Encroachment	**Recreational Use** Reach found to contain adequate pool depth and area, PCR use is recommended. **Anti-Degregadation** **E and T species** none **Declining Species** L.Br.Lamprey (14) **Vunerability** High **BioNarrative** Fair/Good **QHEI** >80 (0) 80-70 (0) ≤70 (100%) **Multiple Attributes** Low ***Recommended Tier*:** GHQW

Comments: Primary causes and sources of aquatic life use impairment were associated with diminished macrohabitat quality (direct channel modification and excessive sand bedload). The deleterious effects of these negative features were likely heightened or magnified by the nature of the lowland soils. The series of Hocking river tributaries flowing from the west (Brushy Fork, Buck Run, and lower Clear Creek) are identified as draining and coursing through highly sandy soils, originating from exposed sandstone that dominate the uplands. These soil types have greater potential for instability and likely the serve as an inexhaustible local source of sand bedload, the observed accumulations and resulting habitat monotony initiated through hydromodification.

Brushy Fork (01-044)	**Aquatic Life Use**		**Indicators**	**Leading Causes/Sources of Aquatic Life use Impairment**	**Other Beneficial Uses/Tiers**
	Existing	**Rec.**			
	WWH*	WWH	PARTIAL Attainment	**Cause(s)**: Sedimentation	**Recreational Use**

Attainment **Full:** 0.0 miles **Partial:** 1.0 miles **Non:** 0.0 miles **Length:** 1.0			-MG Fish/Fair Bugs -Poor QHEI (44.0) -DO (=B) -Nutrients (~B) -NH_3-N (>B) -BOD_5 (=B) -pH (~B) -TDS(<B) -Condct. (Elevated)	(sand beadload), and Direct Habitat Alteratrions **Source(s)**:Channelization and Natural (sand)	Reach found to contain adequate pool depth and area, PCR use is recommended. **Anti-Degregadation** **E and T species** none **Declining Species** S.R.B. Dace (21) **Vunerability** High **BioNarrative** Good **QHEI** >80 (0) 80-70 (0) ≤70 (100%) **Multiple Attributes** Low ***Recommended Tier*:** GHQW

Comments: Aquatic life use impairment was driven by subpar performance of the benthic macroinvertebrate community. Water chemistry was found consistent with WQ criteria, as adequate DO, and low nutrient and demand parameters were observed. Impairment appeared associated with simplified macrohabitat and excessive sand bedload. These conditions limited taxa diversity, by creating homogenous habitat. As the channel was deeply incised, sand bedload is effectively contained within the active channel, even during elevated flows, thus diminishing the stream's ability to regularly purge fine bedload material into the flood plain.

The deleterious effects of these negative features were likely heightened or magnified by the nature of the lowland soils. The suite of Hocking River tributaries flowing from the west (Brushy Fork, Buck Run, and lower Clear Creek) are identified as draining and coursing through highly sandy soils, originating from exposed sandstone that dominate the uplands. These soil types have greater potential for instability and likely the serve as an inexhaustible local source of sand bedload, the observed accumulations and resulting habitat monotony initiated through hydromodification.

Buck Run (01–042)	**Aquatic Life Use**		**Indicators**	**Leading Causes/Sources of Aquatic Life use Impairment**	**Other Beneficial Uses/Tiers**
	Existing	**Rec.**			
Attainment **Full:** 2.1 miles **Partial:** 0.9 miles **Non:** 0.0 miles **Length:** 3.0	WWH*	WWH	PARTIAL Attainment **Lower 0.9 Miles** -MG Fish/Fair Bugs -WWH QHEI -DO (=B) -Nutrients (=B) -NH3-N (~B) -BOD_5 (=B) -pH (>B) -TDS(<B) -Condct. (Elevated) -Two of five samples found Fecal coliform counts in excess of PRC max.	**Cause(s)**: Sedimentation (sand), and Direct Habitat Alterations **Source(s)**: Channelization and Natural (sand)	**Recreational Use** Reach contained adequate pool depth and area, PCR use is recommended. **Anti-Degregadation** **E and T species** none **Declining Species** L.Br.Lamprey (98) S.R.B. Dace (18) **Vunerability** Moderate **BioNarrative**

					M.Good/Fair **QHEI** >80 (0) 80-70 (0) ≤70 (100%) **Sensitive Species** 1 Species 4.3/0.3km (0.75%) **Multiple Attributes** Low ***Recommended Tier*:** GHQW

Comments: Of the approximately four miles assessed, only the lower 0.9 miles of Buck Run were found impaired. Failure to meet the prescribed biocriteria was driven by subpar performance of the benthic macroinvertebrate community. As observed for many other tributaries contained within HUC 0503020010, water chemistry was found consistent with WQ criteria. Impairment appeared associated with simplified macrohabitat and excessive sand bedload. These conditions limited taxa diversity, by creating homogenous habitat. As the channel was deeply incised, sand bedload is effectively contained within the active channel, even during elevated flows, thus diminishing the stream's ability to regularly purge fine bedload material into the flood plain.

The deleterious effects of these negative features were likely heightened or magnified by the nature of the lowland soils. The suite of Hocking River tributaries flowing from the west (Brushy Fork, Buck Run, and lower Clear Creek) are identified as draining and coursing through highly sandy soils, originating from exposed sandstone that dominate the uplands. These soil types have greater potential for instability and likely the serve as an inexhaustible local source of sand bedload, the observed accumulations and resulting habitat monotony initiated through hydromodification.

Additionally, numerous citizens complaints have been filed against a small seasonally operated meat processor (Abram Edwards Meats) located further upstream on the East Fork Buck Run. Complaints included the intermittent release of process water and disposal of miscellaneous refuse and discarded appliances in the flood plain. An unusual concentration of refuse was observed at RM 0.9, that included used appliances, cut brush, and general household wastes.

E. Frk. Buck Run (01-043)	**Aquatic Life Use**		**Indicators**	**Leading Causes/Sources of Aquatic Life use Impairment**	**Other Beneficial Uses/Tiers**
	Existing	**Rec.**			
Attainment **Full:** 0.0 miles **Partial:** 1.0 miles **Non:** 0.0 miles **Length:** 1.0	WWH*	WWH	PARTIAL Attainment -MG Fish/Fair Bugs -WWH QHEI (56.0) -DO (=B) -Nutrients (=B) -BOD_5 (=B) -pH (~B) -TDS(<) -Condct. (=B)	**Cause(s)**: Sedimentation (sand bedload) **Source(s)**: Natural (sand)	**Recreational Use** Although pool depth and area just short of criteria, proximity of low density residential areas argues for the PCR use. **Anti-Degregadation** **E and T species** none **Declining Species** L.Br.Lamprey (18) S.R.B. Dace (20) **Vunerability** High **BioNarrative** M.Good/Fair

					QHEI >80 (0) 80-70 (0) ≤70 (100%) **Sensitive Species** none **Multiple Attributes** Low ***Recommended Tier*:** GHQW

Comments: Failure to meet the prescribed biocriteria was driven by subpar performance of the benthic macroinvertebrate community. As observed for many other tributaries contained within HUC 0503020010, all indicators of water quality were found consistent with WQ criteria. Biological impairment appeared associated with simplified macrohabitat and excessive sand bedload. These conditions limited taxa diversity, by creating homogenous habitat. As the channel was deeply incised, sand bedload is effectively contained within the active channel even during elevated flows, diminishing the stream's ability to regularly purge fine bedload material into the flood plain.

The deleterious effects of these negative features were likely heightened or magnified by the nature of the lowland soils. The suite of Hocking River tributaries flowing from the west (Brushy Fork, Buck Run, and lower Clear Creek) are identified as draining and coursing through highly sandy soils, originating from exposed sandstone that dominate the uplands. These soil types have greater potential for instability and likely the serve as an inexhaustible local source of sand bedload, the observed accumulations and resulting habitat monotony initiated through hydromodification.

Additionally, numerous citizens complaints have been filed against a small seasonally operated meat processor (Abram Edwards Meats) located adjacent to the sampling station on East Fork Buck Run. Complaints included the release of process water and disposal of miscellaneous refuse and discarded appliances in the flood plain.

UN Hocking @ RM 74.82 (01-062)	**Aquatic Life Use**		**Indicators**	**Leading Causes/Sources of Aquatic Life use Impairment**	**Other Beneficial Uses/Tiers**
	Existing	**Rec.**			
Attainment **Full:** 1.0 miles **Partial:** 0.0 miles **Non:** 0.0 miles **Length:** 1.0	Unlisted	WWH	FULL Attainment	NA	**Recreational Use** Reach contained adequate pool depth and area, PCR use is recommended. **Anti-Degregadation** **E and T species** none **Declining Species** L.Br.Lamprey (9) S.R.B. Dace (5) **Vunerability** High **BioNarrative** Exceptional/V.Good **QHEI** >80 (0) 80-70 (0) ≤70 (100%) **Sensitive Species**

					3 Species 23/0.3km (7%) **Multiple Attributes** Moderate ***Recommended Tier*:** GHQW
Comments: Reach evaluated found to contain fish and benthic macroinvertebrate communities consistent with applicable biocriteria.					
Upper Rush Creek WAU: 0503020-020					
Rush Creek (01-500)	**Aquatic Life Use**			**Leading Causes/Sources of Aquatic Life use Impairment**	**Other Beneficial Uses/Tiers**
	Existing	**Rec.**	**Indicators**		
RM29.7-15.7 **Attainment** **Full:** 0.0 miles **Partial:** 0.0 miles **Non:** 14.3 miles **Length:** 14.3	LRW	LRW	NON Attainment **Headwaters to RM 15.7** -Poor-Very Poor Fish/Bugs -Very Good-Fair QHEI (74.5-52.0) -DO (3.24-8.68) -Nutrients (extremely elevated) -NH_3-N (highly elevated) -TKN (elevated) -BOD_5 (background) -COD_5 (background) -pH (3.08-7.51) -TDS (highly elevated) -Sulfate(highly elevated) -Mn (extremely elevated, max 14,500) -Al (extremely elevated, max 13,800) -Condct. (highly elevated) -F.coliform	**Cause(s):** Low pH, Low DO, Al, Nutrient Enrichment, Ammonia-N, and Other (secondary AMD) **Source(s):** AMD and POTW (New Lexington) **Cumulative Impaired Miles** ***Cause*s** -Low pH (9.7 miles) -Low DO (2.9 miles) -Al (11.4 miles) -Nutrients (6.4 miles) -Ammonia-N (11.4 miles) -Other, secondary AMD (4.6 miles) ***Sources*** -AMD (14.3 miles) -POTW (11.8 miles)	**Recreational Use** Reach contained adequate pool depth and area, PCR use is recommended, for unverified segments. **Anti-Degregadation** **E and T species** none **Declining Species** L.Br.Lamprey (1) **Vunerability** Low **BioNarrative** Poor/V.Poor **QHEI** >80 (0) 80-70 (25%) ≤70 (75%) **Multiple Attributes** Low ***Recommended Tier*:** LQW

Existing Conditions

Profoundly degraded conditions were indicated through all of upper Rush Creek. Few if any fish were found and a highly degraded invertebrate assemblage was universally observed at all monitoring sites throughout the 14.3 river miles that comprise the upper Rush Creek mainstem. Water chemistry results for most of this segment clearly portrayed the effects of AMD: low pH and elevated to extremely elevated TDS, Mn, Al, and Sulfate.

Existing AMD impacts may have been compounded by the release of nutrients, ammonia-N, and oxygen demanding wastes from the New Lexington WWTP. However, the additive nature of these pollutant loads and their relative contribution to the existing degraded conditions of upper Rush Creek are not entirely clear or certain. It is difficult to neatly separate and independently appraise the effects of New Lexington in light of the complexities surrounding the existing and compelling impacts associated with AMD. Through the NPDES permitting process, efforts are underway to address some of the WQ problems long associated with New Lexington. Presently, the facility is operating under a consent decree aimed at addressing the I&I problems that have led to regular bypassing from facility's inadequate equalization basin. However, it is important to note that even full compliance with the consent decree would bring the POTW into accord with its existing *secondary limits* only. The relatively lax associated performance standards are a result of the existing LRW use designation for the receiving stream.

To varying degrees, chemical indicators of AMD were gradually reduced with increasing downstream distance from

New Lexington. Dilutional flows from unimpacted tributaries appeared to reduce the concentration of deleterious constituents of AMD and raise the pH. This in turn initiates the precipitation of vast quantities of dissolved metals (iron, aluminum, and manganese) from the water column. These precipitates create a set of secondary environmental problems in-and-of themselves, that are still ultimately associated with AMD, though not typically captured in routine WQ monitoring. Therefore, despite improvements in water column AMD indicators, longitudinal ambient biological performance remained unchanged through this area of transition and appeared controlled by the primary and secondary effects of AMD as described above. The universally very poor condition of the aquatic community through upper Rush Creek, argues for this interpretation, as ambient biological performance was far below what would be expected from the influence of the New Lexington WWTP alone, and is consistent with that observed in the reaches affected by AMD, upstream from New Lexington. At worst the effects of the POTW were secondary or tertiary in nature.

AMD Abatement

Per discussions with Ohio DNR, Mineral Resources, and their principal contractor/governmental partner for AMD abatement projects, ILGARD, no watershed group has been formed around the mining issues and associated impacts within upper Rush Creek. However an assessment of this area by the USGS (2005) stimulated interest in the development of a DNR sponsored AMDAT. Presently, ILGARD has been awarded a contract to begin phase I of an AMDAT for upper Rush Creek. As currently understood and characterized by ILGARD, the problems within the upper watershed are diverse and complex. Upper Rush Creek is affected by the full suite of post mining WQ problems (abandoned and unreclaimed surface and subsurface mines, exposed mine spoil, tailings, and gob, etc.), and are comparable in form and geology to those found in the adjacent Moxohala Creek basin. Based upon ILGARD's own experience in Moxohalia Creek and their preliminary assessment of upper Rush Creek, the restorability of the upper watershed is for all practical purposes unachievable. Future restoration efforts will be focused solely at improving WQ, namely pH, in the mainstem of Rush Creek, upstream of New Lexington. No actions aimed at restoring impacted tributaries in their own right are anticipated, as these waters will be left as is or perhaps serve as components of the AMD treatment system. It is important to note that the express goal of phase I of the Rush Creek AMDAT is the identification, inventory, and quantification of existing AMD problems. Proposed solutions, associated costs and other sundry aspects of planning and implementation will stem from the findings of phase I.

Aquatic Life Use Recommendation

Ultimately, the information, various lines of evidence, and interpretation of said evidence provided above must be duly considered regarding the central issue for upper Rush Creek; namely, whether or not to retain or otherwise reaffirm the existing LRW, mine affected, aquatic life use designation. Abandoning the LRW use in favor of the more protective WWH designation appears, at this time, premature. The weight of evidence of both technical and administrative issues argues for the retention of the existing LRW aquatic life use. A four point justifications for this recommendation is presented below:

1) At this time there is no question that much of upper Rush Creek clearly meets the criteria for LRW: sustained low pH and profoundly degraded aquatic communities, all a result of persistent and intractable mine related problems.

2) Upper Rush Creek is presently designated LRW, and as such, NPDES permittees (including New Lexington) currently discharging to this waterbody are operating under effluent limits designed to comport with the associated LRW criteria. Redesignation of upper Rush Creek to a more protective aquatic life use, without out due cause or substantial justification, would create an inappropriate and undue burden on said permitees, without a guarantee of commensurate public benefit.

3) Although the first phase of an Ohio DNR sponsored AMDAT will begin in the summer of 2007, actual abatement activity, if warranted, will not be forth coming. The process of source identification, characterization, design and implementation requires years of effort. At this time, the feasibility and the likelihood of successful abatement for upper Rush Creek are by no means certain, even if the results of the phase I AMDAT recommends the initiation of the design and implementation phases of the AMDAT process.

4) By definition, the LRW use is a temporary designation, and as such any waterbody so designated may be

subject to change pending any developments within the watershed that could affect its potential or otherwise create a reasonable probability of supporting a higher aquatic life use. If any of these conditions are meet through the AMDAT process, the existing LRW use may be replaced with or upgraded to the WWH use through the next reporting cycle or as part of ad hoc rule making.

UN Rush Cr. Trib. @ RM 30.32 (01-511)	**Aquatic Life Use**		**Indicators**	**Leading Causes/Sources of Aquatic Life use Impairment**	**Other Beneficial Uses/Tiers**
	Existing	**Rec.**			
Attainment **Full:** 0.0 miles **Partial:** 0.0 miles **Non:** 2.0 miles **Length:** 2.0	Unlisted	LRW	NON Attainment VP Bugs Only -Fish/Bugs -pH (2.84-2.64) -TDS (extremely elevated)	**Cause(s):**Low pH and TDS **Source(s):** AMD	**Recreational Use** Shallow, isolated AMD stream, coursing through abandoned mine lands. As such the SCR is recommended. **Anti-Degregadation** **E and T species** none **Declining Species** none **Vunerability** Low **BioNarrative** V.Poor (bugs only) **QHEI** none **Multiple Attributes** Low ***Recommended Tier*:** LQW

Comments: Ambient biological assessment of this tributary was achieved through the use of the macrobenthos alone. Very poor narrative performance of the macroinvertebrate community, coupled with extremely low pH and the performance of other key WQ parameter clearly portrayed a pronounce AMD impact.

Per discussions with Ohio DNR, Mineral Resources, and their principal contractor/governmental partner for AMD abetment projects, ILGARD, no watershed group has been formed around the mining issues and associated impacts within upper Rush Creek. However an assessment of this area by the USGS (2005) stimulated interest in the development of a DNR sponsored AMDAT. Presently, ILGARD has been awarded a contract to begin phase I of an AMDAT for upper Rush Creek. As presently understood by ILGARD, the problems here are characterized as diverse and complex. Upper Rush Creek is affected by the full suite of post mining WQ problems (abandoned and unreclaimed surface and subsurface mines, exposed mine spoil, tailings, and gob, etc.), and are comparable to those found in the adjacent Moxohala Creek basin. Based upon ILGARD's own experience in Moxohalia Creek and their preliminary assessment of upper Rush Creek, the restorability of the upper watershed is for all practical purposes unachievable. Future restoration efforts will be focused solely at improving WQ, namely pH, in the mainstem of Rush Creek, upstream of New Lexington. No actions aimed directly at the restoration of impacted tributaries are anticipated, as these waters will be left as is or perhaps serve as components of the AMD treatment system.

Both the findings from the 2004 field survey (profound AMD) and the absence of a specific AMD abatement plan for this and other similarly affected upper Rush Creek tributaries lead to the conclusion that the degraded conditions documented in 2004 are intractable and will in all probability persist into the foreseeable future. Therefore, the

LRW use is recommended for this Rush Creek tributary

Yeager Creek (01-508)	**Aquatic Life Use**		**Indicators**	**Leading Causes/Sources of Aquatic Life use Impairment**	**Other Beneficial Uses/Tiers**
	Existing	**Rec.**			
Attainment **Full:** 0.0 miles **Partial:** 0.0 miles **Non:** 1.0 miles **Length:** 1.0	Unlisted	WWH	NON Attainment Fair Bugs/Poor Fish Fish/Bugs -WWH QHEI (65.0) -DO (4.2-9.32) -Nutrients (elevated) -NH_3-N (elevated) -TKN (=background) -BOD_5 (background) -pH (6.57-7.92) -TDS (~background) -Sulfate (=background) -Mn (elevated) -Al (background) -Condct. (~background) -F.coliform (elevated)	**Cause(s)**: Nutrients enrichment, low DO, and low pH (Tertiary) **Source(s)**:Hydromod. (Urban Run-off from New Lexington), Upstream impoundment, and possible AMD (Tertiary)	**Recreational Use** Reach contained adequate pool depth and area, PCR use is recommended. **Anti-Degregadation** **E and T species** none **Declining Species** none **Vulnerability** Low **BioNarrative** Poor/Fair **QHEI** >80 (0) 80-70 (0) ≤70 (100%) **Multiple Attributes** Low ***Recommended Tier*:** GHQW

Comments: The tributary to Rush Creek at RM 28.46 supported a fair macroinvertebrate community. Organism abundance was relatively low and facultative and tolerant taxa predominated. Suspected impacts included upstream impoundment (New Lexington water supply reservoir), channelization, polluted runoff from the New Lexington urban area, and possible AMD (tertiary impact). The fish community was similarly degraded, with limited species richness, and a predominance of tolerant taxa.

Upstream impoundments can serve to modify the natural flow regime, thermal regime, nutrient and carbon processing of affected downstream segments. Disturbance of these fundamental abiotic and biotic features can significantly alter the composition, structure, and functional organization resident biota. The magnitude of these effects depends upon the type of impoundment, size, and operation regime.

UN Rush Cr. Trib.@RM 27.4 (01-507)	**Aquatic Life Use**		**Indicators**	**Leading Causes/Sources of Aquatic Life use Impairment**	**Other Beneficial Uses/Tiers**
	Existing	**Rec.**			
Attainment **Full:** 0.0 miles **Partial:** 0.0 miles **Non:** 1.0 miles **Length:** 1.0	Unlisted	WWH	NON Attainment -Poor Fish/Fair Bugs -WWH QHEI (60.0) -DO (4.48-9.2) -Nutrients (~background) -NH_3-N (=background) -BOD_5 (background) -pH (6.16-7.33) -TDS (=background) -Sulfate (>background) -Mn (highly elevated)	**Cause(s):** Low pH, low DO, Nutrient Enrichment (Wide DO regime), Sedimentation (sand and iron hydroxide precipitate) **Source(s)**:AMD, Hydromods (urban run-off)	**Recreational Use** Although pool depth and area just short of criteria, proximity of developed areas argues for the PCR use. **Anti-Degregadation** **E and T species** none **Declining Species**

			-Al (background) -Condct. (=background) -F.coliform (extremely elevated, max 60,000)		none **Vulnerability** Low **BioNarrative** Poor/Fair **QHEI** >80 (0) 80-70 (0) ≤70 (100%) **Multiple Attributes** Low ***Recommended Tier*:** GHQW
Comments: The tributary to Rush Creek at RM 27.40 was a small watercourse with a predominantly sand substrate. The diversity and density of macroinvertebrate taxa was low and a black precipitate was noted on rocks and woody debris. Five EPT taxa were collected and the community was rated in fair condition. AMD in the upper watershed was a suspected source of impact at RM 0.3. Fish community performance portrayed similar if not worse conditions. Despite adequate habitat complexity, this tributary was found to support a very simple assemblage of fish, overwhelmingly dominated by tolerant species. This Rush Creek tributary drains and courses through the abandoned mine lands surrounding New Lexington. The influence of this past land use was reflected in both substrate quality and chemical WQ. These stresses were exacerbated by hydromodification associated with the developed areas in and around New Lexington. Although, an impoundment is located on this tributary, its small size and relatively large upstream distance rendered its effects are at best tertiary to condition of the aquatic community.					
Turkey Run (01-560)	**Aquatic Life Use**		**Indicators**	**Leading Causes/Sources of Aquatic Life use Impairment**	**Other Beneficial Uses/Tiers**
	Existing	**Rec.**			
Attainment **Full:** 1.0 miles **Partial:** 0.0 miles **Non:** 0.0 miles **Length:** 1.0	LRW	LRW	FULL Attainment -poor biology -pH (4.8-5.9) -Al (extremely elevated) -Mn (extremely elevated) -Sulfate (elevated) -TDS (elevated)	NA	**Recreational Use** Reach contained adequate pool depth and area, PCR use is recommended. **Anti-Degregadation** **E and T species** none **Declining Species** none **Vunerability** Low **BioNarrative** Poor **QHEI** >80 (0) 80-70 (0) ≤70 (100%) **Multiple Attributes** Low ***Recommended Tier*:** LQW
Comments: The reach of Turkey Run evaluated in 2004 was found to contain an aquatic community that					

performed at a level no better than poor. All indicators of AMD were either elevated or extremely elevated.

Per discussions with Ohio DNR, Mineral Resources, and their principal contractor/governmental partner for AMD abetment projects, ILGARD, no watershed group has been formed around the mining issues and associated impacts within upper Rush Creek. However an assessment of this area by the USGS (2005) stimulated interest in the development of a DNR sponsored AMDAT. Presently, ILGARD has been awarded a contract to begin phase I of an AMDAT for upper Rush Creek. As presently understood by ILGARD, the problems here are characterized as diverse and complex. Upper Rush Creek is affected by the full suite of post mining WQ problems (abandoned and unreclaimed surface and subsurface mines, exposed mine spoil, tailings, and gob, etc.), and are comparable to those found in the adjacent Moxohala Creek basin. Based upon ILGARD's own experience in Moxohalia Creek and their preliminary assessment of upper Rush Creek, the restorability of the upper watershed is for all practical purposes unachievable. Future restoration efforts will be focused solely at improving WQ, namely pH, in the mainstem of Rush Creek, upstream of New Lexington. No actions aimed directly at the restoration of impacted tributaries are anticipated, as these waters will be left as is or perhaps serve as components of the AMD treatment system.

Both the findings from the 2004 field survey (AMD) and the absence of a specific AMD abatement plan for this and other similarly affected upper Rush Creek tributaries lead to the conclusion that the degraded conditions documented in 2004 are intractable and will in all probability persist into the foreseeable future. Therefore, the LRW use is recommended for this Rush Creek tributary.

Dry Run (01-504)	**Aquatic Life Use**		**Indicators**	**Leading Causes/Sources of Aquatic Life use Impairment**	**Other Beneficial Uses/Tiers**
	Existing	**Rec.**			
Attainment **Full:** 0.0 miles **Partial:** 1.0 miles **Non:** 0.0 miles **Length:** 1.0	Unlisted	WWH	PARTIAL Attainment -Fair Fish/MG Bugs -Fair QHEI (57.5) -DO (6.5-9.48) -Nutrients (>background) -NH_3-N (>background) -BOD_5 (=background) -pH (6.05-7.3) -TDS (=background) -Sulfate (background) -Mn (elevated) -Al (background) -Condct. (=background) -F.coliform (background)	**Cause(s):** Low pH and Sedimentation (both sand and silt), Nutrient Enrichment **Source(s):** AMD, Upstream Impoundment	**Recreational Use** Reach contained adequate pool depth and area, PCR use is recommended. **Anti-Degregadation** **E and T species** none **Declining Species** none **Vunerability** Low **BioNarrative** Fair/M.Good **QHEI** >80 (0) 80-70 (0) ≤70 (100%) **Multiple Attributes** Low ***Recommended Tier*:** GHQW

Comments: Viewed in total, available field data from Dry Run suggested that aquatic life use impairment was derived from multiply sources. A low pH and elevated manganese were suggestive modest AMD. Other AMD indicators, however, remained at or near background levels. Nutrient and ammonia-N concentrations were consistently above background levels, resulting in modest enrichment, inferred mainly from a variable DO regime. Lastly, substrates were impacted by excessive sand and finer sediments. Although the net habitat score (QHEI), remained within the acceptable range, substrate quality in particular was diminished. No single environmental indicator appeared absolutely dominant; rather, the combined effects of all of these factors likely resulted in depressed ambient biological performance.

Center Branch (01-550)	**Aquatic Life Use**		**Indicators**	**Leading Causes/Sources of Aquatic Life use Impairment**	**Other Beneficial Uses/Tiers**
	Existing	**Rec.**			
Attainment **Full:** 2.9 miles **Partial:** 4.1 miles **Non:** 0.0 miles **Length:** 7.0	WWH+	WWH	PARTIAL Attainment **Headwaters to RM 3.0** -Fair Fish/Good Bugs -VG QHEI (74.0) -DO (=background) -Nutrients (highly elevated) -NH_3-N (~background) -BOD_5 (=B) -pH (7.44-7.81) -TDS (=B) -Sulfate (<B) -Mn (~B) -Al (=B) -Condct. (=B) -F.coliform (2 PCR exceedence) FULL Attainment **RM 3.0 to 0.1** PARTIAL Attainment **RM 0.1 to mouth** -Fair Fish/E Bugs -WWH QHEI (60.0) -DO (6.21-9.06) -Nutrients (elevated) -NH_3-N (>B) -BOD_5 (=B) -pH (=B) -TDS (=B) -Sulfate(<B) -Mn (>background) -Al (>background) -Condct. (<B) -F.coliform (above background)	Upper Impairment (4.0 miles) **Cause(s):** Sedimentation (silt, embeddednesss and sand, shifting and unstable). **Source(s):** Agriculture (row crop), Pastureland (upstream), Hydromods (ag), Removal of Riparian Vegetation, and Stream bank Destabilization Lower Impairment (0.1 miles) **Cause(s):** Sedimentation (silt, embeddednesss and sand, shifting and unstable), and Nutrient Enrichment **Source(s):** Agriculture (row crop), Hydromods (ag),and AMD (Tertiary, at mouth from Rush Creek hyporheic), Upstream Impoundments (Tertiary)	**Recreational Use** Reach contained adequate pool depth and area, PCR use is recommended. **Anti-Degregadation** **E and T species** none **Declining Species** L.Br.Lamprey (20) Brnd. Madtom (16) **Vunerability** Moderate **BioNarrative** M.Good/Fair **QHEI** >80 (0) 80-70 (33.4%) ≤70 (66.6%) **Sensitive Species** 7 Species 133/0.3km (13.2%) **Multiple Attributes** Modest ***Recommended Tier*:** GHQW Note: Possible SHQW candidate.
Comments: Aquatic life use impairment was documented through the upper and lower segments of Center Branch. The intervening middle segment was found to support a community of aquatic organisms fully consistent with the WWH biological criteria. Multiple sources combined to render the upper and lower segments impaired. Sedimentation, channel instability, and nutrient enrichment appeared derived from agricultural land use and associated pressures on the adjacent riparian areas. In additional to row crop agriculture, the upper reach appeared affected by livestock as well. The potential influence of impoundment cannot be dismissed within this sub-basin, as no fewer than five dams are located within the watershed. Although, no direct evidence of the influence of reservoirs was apparent in the WQ data, these structures may have exacerbated existing problems in Center Branch, in more subtle ways.					
Somerset Cr. (01-551)	**Aquatic Life Use**		**Indicators**	**Leading Causes/Sources of Aquatic Life use Impairment**	**Other Beneficial Uses/Tiers**
	Existing	**Rec.**			
Attainment **Full:** 1.0 miles **Partial:** 0.0 miles	EWH*	WWH	FULL Attainment	NA	**Recreational Use** Reach contained adequate pool depth and area, PCR use

Non: 0.0 miles **Length:** 1.0					is recommended. **Anti-Degregadation** **E and T species** none **Declining Species** L.Br.Lamprey (1) **Vunerability** High **BioNarrative** Good **QHEI** >80 (0) 80-70 (0) ≤70 (100%) **Multiple Attributes** Low ***Recommended Tier*:** GHQW
Comments: Somerset Creek was originally designated EWH as part of the 1978 WQS. As this initial designation was, by definition, unverified, actual field data collected as part of the 2004 Hocking River basin and their resulting interpretation, supersedes the original classification. The results from said 2004 survey found that the free flowing portions of Somerset Creek did not demonstrate or possess reasonable potential to support and exceptional assemblage of aquatic organisms. Therefore the WWH aquatic life use is recommended for the free flowing segments Somerset Creek. Based upon the recommended WWH aquatic life, reach evaluated found to contain fish and benthic macroinvertebrate communities consistent with applicable biocriteria. The EWH aquatic life use will be retained for the impounded stream reach formed by the Somerset Reservoir dam, a public lake.					
UN Rush Cr Trib @ RM 19.4 (01-501)	**Aquatic Life Use**		**Indicators**	**Leading Causes/Sources of Aquatic Life use Impairment**	**Other Beneficial Uses/Tiers**
	Existing	**Rec.**			
Attainment **Full:** 0.0 miles **Partial:** 2.0 miles **Non:** 0.0 miles **Length:** 2.0	Unlisted	WWH	PARTIAL Attainment -Fair Fish/MG Bugs -WWH QHEI (60.5) -DO (5.63-7.85) -Nutrients (~background) -NH_3-N (elevated) -TKN (elevated) -BOD_5 (=B) -pH (6.74-7.48) -TDS(=B) -Sulfate (<background) -Mn (elevated) -Al (~B) -Condct. (<background) -F.coliform (background)	**Cause(s):** Sedimentation (silt, embeddedness) and Nutrient Enrichment **Source(s):** Pastureland, and Upstream Impoundment	**Recreational Use** Reach contained adequate pool depth and area, PCR use is recommended. **Anti-Degregadation** **E and T species** none **Declining Species** none **Vunerability** Low **BioNarrative** Fair/M.Good **QHEI** >80 (0) 80-70 (0) ≤70 (100%) **Multiple Attributes** Low ***Recommended Tier*:** GHQW

Comments: Sedimentation, primarily silt, and nutrient enrichment were considered the principal causes of aquatic life use impairment. Associated sources were livestock (pasture) and upstream impoundment.					
UN Rush Cr Trib @ RM 17.89 (01-513)	**Aquatic Life Use**		**Indicators**	**Leading Causes/Sources of Aquatic Life use Impairment**	**Other Beneficial Uses/Tiers**
	Existing	**Rec.**			
Attainment **Full:** 1.0 miles **Partial:** 0.0 miles **Non:** 0.0 miles **Length:** 1.0	Unlisted	WWH	FULL Attainment	NA	**Recreational Use** Although reach found to lack adequate pool depth and area, PCR use is recommended, given the potential or likelihood of recreational use, especially by children. **Anti-Degregadation** **E and T species** none **Declining Species** none **Vunerability** High **BioNarrative** V.Good/Good **QHEI** >80 (0) 80-70 (0) ≤70 (100%) **Multiple Attributes** Low ***Recommended Tier*:** GHQW
Comments: Reach evaluated found to contain fish and benthic macroinvertebrate communities consistent with applicable biocriteria.					
Lower Rush Creek WAU: 0503020-030					
Rush Creek (01-500)	**Aquatic Life Use**		**Indicators**	**Leading Causes/Sources of Aquatic Life use Impairment**	**Other Beneficial Uses/Tiers**
	Existing	**Rec.**			
RM 15.7-0.0 **Attainment** **Full:** 15.7 miles **Partial:** 0.0 miles **Non:** 0.0 miles **Length:** 15.7	MWH+	MWH and WWH	Full Attainment indicated for all recommended and existing Aquatic life uses	NA	**Recreational Use** PCR, verified **Anti-Degregadation** **E and T species** none **Declining Species** Brnd. Madtom (93) Rosyface Sh. (11) **Vunerability** Moderate

					BioNarrative M.Good/V.Good **QHEI** >80 (0) 80-70 (0) <u>≤</u>70 (100%) **Sensitive Species** 14 Species 182/km (60%) **Multiple Attributes** Moderate ***Recommended Tier*:** SHQW (RM 14.39-0.0)

Comments: Presently, the entire length of the lower 15.7 miles of Rush Creek is designated MWH (mine affected). This use was recommended based upon the results from previous biosurveys (1980s and early 1990s). As part of the 2004 Hocking River basin survey, the entire length of Rush Creek was re-evaluated. Compared against the previous survey results, which portrayed significant degradation, the lower 12.7 miles of Rush Creek was found to fully support WWH aquatic communities in 2004. Given that this segment is now meeting the WWH biocriteria, it is therefore recommended to be redesigned to WWH. The remaining upper three miles are recommended to retain the MWH use, as it best reflects the potential of this transitional area.

Based upon the recommended and existing aquatic life uses, Rush Creek was found to support fish and benthic macroinvertebrate communities consistent with the applicable biocriteria.

Recommended Use Summary

<u>Existing</u>	<u>Recommended</u>
MWH RM15.7(Little Rush Creek) to mouth	MWH RM 15.7 (L. Rush Creek) to RM 14.39 (Raccoon Run) WWH RM 14.39 (Raccoon Run) to mouth

L. Rush Cr. (01-540)	**Aquatic Life Use**		**Indicators**	**Leading Causes/Sources of Aquatic Life use Impairment**	**Other Beneficial Uses/Tiers**
	Existing	**Rec.**			
Attainment **Full:** 19.0 miles **Partial:** 0.0 miles **Non:** 0.0 miles **Length:** 19.0	WWH+	WWH	FULL Attainment	NA	**<u>Recreational Use</u>** Reach found to contain adequate pool depth and area, PCR use is recommended. **<u>Anti-Degregadation</u>** **E and T species** none **Declining Species** Brnd. Madtom (99) Sand Darter (3) S.R.B.Dace (56) **Vunerability** High **BioNarrative** Good **QHEI** >80 (0) 80-70 (0) <u>≤</u>70 (100%) **Senstive Species**

					10species 364/0.3km (23%) **Multiple Attributes** Moderate ***Recommended Tier*:** SHQW (RM 7.2-0.0)
Comments: Reach evaluated found to contain fish and benthic macroinvertebrate communities consistent with applicable biocriteria. Note: Full attainment despite active channel maintenance by RCCD through lower reach. The impounded segment of Little Rush Creek formed by Rush Creek Lake dam (a public lake) is recommended to be designated EWH. The WWH aquatic life use is recommended to be retained for all remaining, free flowing, segments of Little Rush Creek.					
Indian Creek (01-541)	**Aquatic Life Use**		**Indicators**	**Leading Causes/Sources of Aquatic Life use Impairment**	**Other Beneficial Uses/Tiers**
	Existing	**Rec.**			
Attainment **Full:** 2.4 miles **Partial:** 0.6 miles **Non:** 0.0 miles **Length:** 3.0	WWH*	WWH	FULL Attainment **Headwaters to RM 0.6** PARTIAL Attainment **RM 0.6 to mouth** -VG Fish/Fair Bugs -WWH QHEI (70.5) -DO (4.74-7.92) -Nutrients (highly elevated) -NH_3-N (elevated) -BOD (highly elevated) -COD (=B) -pH (=B) -TDS (=B) -Sulfate (=B) -Mn (=B) -Al(=B) -Condct. (=B) -F.coliform (=background)	**Cause(s):** DO/Organic Enrichment and Nutrient Enrichment (both, exported from Reservoir) **Source(s):** Upstream Impoundment (Oak Thorp)	**Recreational Use** Reach found to contain adequate pool depth and area, PCR use is recommended. **Anti-Degregadation** **E and T species** none **Declining Species** Brnd Madtom (2) **Vunerability** Moderate **BioNarrative** M.Good/Fair **QHEI** >80 (0) 80-70 (50%) ≤70 (50%) **Multiple Attributes** Low ***Recommended Tier*:** GHQW
Comments: Aquatic life use impairment in Indian Creek was limited to the lower half mile. The remaining upper segment was found to support an assemblage of aquatic life fully consistent with existing and recommended aquatic life use(s). Sampling at RM 0.6 revealed a macroinvertebrate community structure that was overwhelmingly influenced by a proliferation of phytoplankton in and exported from Oak Thorp Reservoir. The resultant plankton laden release from the Oak Thorp, supported a high density of facultative flatworms and bryozoans through the receiving downstream waters. This reservoir effect was also manifest in the analytical WQ results, namely elevated nutrients, elevated ammonia-N, and depressed DO. Appraisal of community performance and habitat potential argued for the affirmation of the WWH aquatic life use for free flowing segment of Indian Creek. The EWH aquatic life use is recommended for the impounded stream reach formed by the Somerset Reservoir dam, a public lake.					
UN L. Rush Trib. @ RM	**Aquatic Life Use**			**Leading Causes/Sources**	**Other**

17.51 (01-543)	**Existing**	**Rec.**	**Indicators**	**of Aquatic Life use Impairment**	**Beneficial Uses/Tiers**
Attainment **Full:** 1.0 miles **Partial:** 0.0 miles **Non:** 0.0 miles **Length:** 1.0	Unlisted	WWH	FULL Attainment	NA	**Recreational Use** Reach found to contain adequate pool depth and area, PCR use is recommended. **Anti-Degregadation** **E and T species** none **Declining Species** Brnd. Madtom (10) **Vunerability** High **BioNarrative** M.Good **QHEI** >80 (0) 80-70 (0) ≤70 (100%) **Multiple Attributes** Low ***Recommended Tier*:** GHQW
Comments: Reach evaluated found to contain fish and benthic macroinvertebrate communities consistent with applicable biocriteria.					
Raccoon Run (01-530)	**Aquatic Life Use**		**Indicators**	**Leading Causes/Sources of Aquatic Life use Impairment**	**Other Beneficial Uses/Tiers**
	Existing	**Rec.**			
Attainment **Full:** 3.0 miles **Partial:** 2.0 miles **Non:** 0.0 miles **Length:** 5.0	WWH+	WWH	PARTIAL Attainment **Headwaters to RM 3.0** -Good Fish/Fair Bugs -WWH QHEI (68.5) -DO (5.95-10.69) -Nutrients (highly elevated) -NH3-N (elevated) -BOD (~B) -pH (=B) -TDS (<background) -Sulfate (=B) -Mn (<background) -Al (=B) -Condtc. (=B) -F.coliform (=B) FULL Attainment RM 3.0 to mouth	**Cause(s):** Nutrient Enrichment, Direct Habitat Alterations, Sedimentation (silt, embeddedness) **Source(s):** Channelization (past), Upstream Impoundment, Removal of Riparian Vegetation(Ag), and Agriculture (row crop)	**Recreational Use** Reach found to contain adequate pool depth and area, PCR use is recommended. **Anti-Degregadation** **E and T species** none **Declining Species** Brnd. Madtom (26) **Vunerability** Low **BioNarrative** Good/M.Good **QHEI** >80 (0) 80-70 (0) ≤70 (100%) **Multiple Attributes** Low

					***Recommended Tier*:** GHQW
Comments: Aquatic life use impairment was limited to the headwaters. High nutrient levels and channelization significantly impacted the headwaters of Raccoon Run. Macroinvertebrate community condition was poor at RM 4.8. Sampling of substrates with current produced masses of blackflies and only one pollution sensitive taxa was recorded at the site. Elevated nutrients and ammonia-N, coupled with a highly variable DO regime support the conclusions drawn from the macrobenthos, regarding nutrient enrichment. The lower three miles was found to support a community of aquatic life fully consistent with the WWH biological criteria.					
UN Raccoon R. Trib @ RM 3.62 (01-531)	**Aquatic Life Use**		**Indicators**	**Leading Causes/Sources of Aquatic Life use Impairment**	**Other Beneficial Uses/Tiers**
	Existing	**Rec.**			
Attainment **Full:** 0.0 miles **Partial:** 0.0 miles **Non:** 3.0 miles **Length:** 3.0	Unlisted	WWH	NON Attainment -Fair Fish/Fair-Poor Bugs -Fair-Poor QHEI(56.0-41.0) -DO (6.29-8.76) -Nutrients (highly elevated) -NH_3-N (highly elevated) -BOD (~B, Except 140!) -pH (=B) -TDS (=B) -Sulfate (=B) -Mn (=B) -Al (=B) -Condct. (=B) -F.coliform (elevated)	**Cause(s)**: Sedimentation (silt, embeddedness, and sand), Nutrient Enrichment, Organic Enrichment **Source(s)**:POTW (minor, Cyril-Scott) and Industrial (Ralston, Non Permitted Industrial Storm Water), Channelization, Agriculture (Row Crop, Tertiary), and Upstream Impoundment (Tertiary)	**Recreational Use** Reach found to contain adequate pool depth and area, PCR use is recommended. **Anti-Degregadation** **E and T species** none **Declining Species** S.R.B.Dace (1) **Vunerability** Low **BioNarrative** Fair/Poor **QHEI** >80 (0) 80-70 (0) ≤70 (100%) **Multiple Attributes** Low ***Recommended Tier*:** GHQW
Comments: The fair community condition was attributed to channelization, sedimentation, continued organic enrichment related to Ralston Purina and possible nutrient enrichment from agricultural runoff. Enrichment associated with Ralston Purina, appeared related to day to day operations and material handling rather than direct production or process wastes. To date, steps to remedy the problem have been undertaken, and associated impact should be abated.					
Turkey Run (01-520)	**Aquatic Life Use**		**Indicators**	**Leading Causes/Sources of Aquatic Life use Impairment**	**Other Beneficial Uses/Tiers**
	Existing	**Rec.**			
Attainment **Full:** 2.0 miles **Partial:** 0.0 miles **Non:** 0.0 miles	WWH+	WWH	FULL Attainment	NA	**Recreational Use** Reach found to contain adequate pool depth and area, PCR use is

Length: 2.0					recommended. **Anti-Degregadation** **E and T species** none **Declining Species** L.Br.Lamprey (1) **Vunerability** High **BioNarrative** M.Good/Exceptional **QHEI** >80 (0) 80-70 (0) ≤70 (100%) **Multiple Attributes** Low ***Recommended Tier*:** GHQW
Comments: Reach evaluated found to contain fish and benthic macroinvertebrate communities consistent with applicable biocriteria.					
Durbin Run (01-510)	**Aquatic Life Use**		**Indicators**	**Leading Causes/Sources of Aquatic Life use Impairment**	**Other Beneficial Uses/Tiers**
	Existing	**Rec.**			
Attainment **Full:** 1.0 miles **Partial:** 0.0 miles **Non:** 0.0 miles **Length: 1.0**	WWH+	WWH	FULL Attainment	NA	**Recreational Use** Reach found to contain adequate pool depth and area, PCR use is recommended. **Anti-Degregadation** **E and T species** none **Declining Species** none **Vunerability** High **BioNarrative** M.Good **QHEI** >80 (0) 80-70 (0) ≤70 (100%) **Multiple Attributes** Low ***Recommended Tier*:** GHQW
Comments: Reach evaluated found to contain fish and benthic macroinvertebrate communities consistent with applicable biocriteria					
UN Rush Cr Trib @ RM	**Aquatic Life Use**		**Indicators**	**Leading Causes/Sources**	**Other**

2.06 (01-512)	**Existing**	**Rec.**		**of Aquatic Life use Impairment**	**Beneficial Uses/Tiers**
Attainment **Full:** 0.0 miles **Partial:** 0.0 miles **Non:** 1.0 miles **Length:** 1.0	Unlisted	CWH	NON Attainment -Poor Fish/MG Bugs -Fair QHEI (53.0) -DO (8.21-10.01) -Nutrients (highly elevated) -NH_3-N (~background)) -BOD (=B) -COD (~B, except 44) -pH (=B) -TDS -Sulfate -Mn (<B) -Al (~B) -Condct. (=B) -F.coliform (1 PCR exceedenece)	**Cause(s):** Sedimentation (sand, shifting and unstable), Nutrient Enrichment (from Impoundment) **Source(s):** Agriculture (row crop, uplands), Natural, Hydromod (ag), and Impoundment	**Recreational Use** Although reach found to lack adequate pool depth and area, PCR use is recommended, given the potential or likelihood of recreational use, especially by children. **Anti-Degregadation** **E and T species** none **Declining Species** L.Br.Lamprey (1) **Vunerability** Low **BioNarrative** Poor/M.Good **QHEI** >80 (0) 80-70 (0) ≤70 (100%) **Multiple Attributes** Low ***Recommended Tier*:** GHQW
Comments: Given the presence of five coldwater invertebrate taxa and a single coldwater fish species, a Coldwater Habitat (CWH) aquatic life use designation is recommended. Aquatic life use impairment was driven by a failure of the fish community to meet the interim CWH biocriteria. The fish assemblage was simple and overwhelmingly dominated by a single tolerant, omnivorous, pioneering species. Diminished community performance appeared related to deficient macrohabitat and nutrient enrichment.					
Clear Creek WAU: 0503020-040					
Clear Creek (01-400)	**Aquatic Life Use**		**Indicators**	**Leading Causes/Sources of Aquatic Life use Impairment**	**Other Beneficial Uses/Tiers**
	Existing	**Rec.**			
Attainment **Full:** 22.0 miles **Partial:** 0.0 miles **Non:** 0.0 miles **Length:** 22.0	WWH+	WWH	FULL Attainment	NA	**Recreational Use** PCR, verified **Anti-Degregadation** **E and T species** none **Declining Species** L.Br.Lamprey (28) Brnd. Madtom (17) Rosyface Sh. (210) S.R.B. Dace (36) **Vunerability** High

					BioNarrative V.Good **QHEI** >80 (0) 80-70 (40%) ≤70 (60%) **Sensitive Species** 11species 168/0.3km (26.4%) **Multiple Attributes** Low ***Existing Tier*:** SHQW (RM 9.52-0.0)
Comments: Reach evaluated found to contain fish and benthic macroinvertebrate communities consistent with applicable biocriteria.					
Cattail Creek (01-401)	**Aquatic Life Use**		**Indicators**	**Leading Causes/Sources of Aquatic Life use Impairment**	**Other Beneficial Uses/Tiers**
	Existing	**Rec.**			
Attainment **Full:** 1.0 miles **Partial:** 0.0 miles **Non:** 0.0 miles **Length:** 1.0	WWH+	WWH	FULL Attainment	NA	**Recreational Use** Reach found to contain adequate pool depth and area, PCR use is recommended. **Anti-Degregadation** **E and T species** none **Declining Species** L.Br.Lamprey (1) **Vunerability** High **BioNarrative** Good **QHEI** >80 (0) 80-70 (33.4%) ≤70 (66.6%) **Multiple Attributes** Low ***Recommended Tier*:** GHQW
Comments: Reach evaluated found to contain fish and benthic macroinvertebrate communities consistent with applicable biocriteria.					
Muddy Prairie Run (01-420)	**Aquatic Life Use**		**Indicators**	**Leading Causes/Sources of Aquatic Life use Impairment**	**Other Beneficial Uses/Tiers**
	Existing	**Rec.**			

Attainment **Full:** 4.0 miles **Partial:** 0.0 miles **Non:** 0.0 miles **Length:** 4.0	WWH+	WWH	FULL Attainment	NA	**Recreational Use** PCR, verified **Anti-Degregadation** **E and T species** none **Declining Species** L.Br.Lamprey (11) Brnd Madtom (2) S.R.B. Dace (29) **Vunerability** High **BioNarrative** Good **QHEI** >80 (0) 80-70 (50%) ≤70 (50%) **Sensitive Species** 1 Species 1.5/0.3km (0.08%) **Multiple Attributes** Modest ***Recommended Tier*:** SHQW
Comments: Reach evaluated found to contain fish and benthic macroinvertebrate communities consistent with applicable biocriteria.					
Arney Run (01-410)	**Aquatic Life Use**		**Indicators**	**Leading Causes/Sources of Aquatic Life use Impairment**	**Other Beneficial Uses/Tiers**
	Existing	**Rec.**			
Attainment **Full:** 5.0 miles **Partial:** 0.0 miles **Non:** 0.0 miles **Length:** 5.0	WWH+	WWH	FULL Attainment	NA	**Recreational Use** PCR, verified **Anti-Degregadation** **E and T species** none **Declining Species** L.Br.Lamprey (1) Brnd Madtom (4) **Vunerability** Moderate **BioNarrative** M.Good/Good **QHEI** >80 (0) 80-70 (50%) ≤70 (50%) **Sensitive Species** 2 species 30/0.3km (0.54%) **Multiple Attributes** Low ***Existing Tier:*** SHQW (RM 2.2-0.0)

Comments: Reach evaluated found to contain fish and benthic macroinvertebrate communities consistent with applicable biocriteria. Water quality results near mouth indicated the influence of the SEOCF WWTP. Namely, nutrients, ammonia-N, and $cBOD_5$ were elevated. Although these observations were not sufficient to render lower Arney Run impaired, they do warrant preventative actions to maintain existing conditions.

UN Clear Cr Trib. @ RM 6.8 (01-404)	**Aquatic Life Use**		**Indicators**	**Leading Causes/Sources of Aquatic Life use Impairment**	**Other Beneficial Uses/Tiers**
	Existing	**Rec.**			
Attainment **Full:** 1.0 miles **Partial:** 0.0 miles **Non:** 0.0 miles **Length:** 1.0	Unlisted	CWH	FULL Attainment	NA	**Recreational Use** Reach found to contain adequate pool depth and area, PCR use is recommended. **Anti-Degregadation** **E and T species** none **Declining Species** L.Br.Lamprey (9) **Vunerability** High **BioNarrative** M.Good/Good **QHEI** >80 (0) 80-70 (0) ≤70 (100%) **Sensitive Species** none **Multiple Attributes** Low ***Recommended Tier*:** GHQW

Comments: Given the presence of three coldwater invertebrate taxa and single coldwater fish taxa, the CWH designation is recommended for this Clear Creek tributary. Reach evaluated was found to contain fish and benthic macroinvertebrate communities consistent with the interim biocriteria.

UN Clear Cr Trib. @ RM 4.93 (01-403)	**Aquatic Life Use**		**Indicators**	**Leading Causes/Sources of Aquatic Life use Impairment**	**Other Beneficial Uses/Tiers**
	Existing	**Rec.**			
Attainment **Full:** 1.0 miles **Partial:** 0.0 miles **Non:** 0.0 miles **Length:** 1.0	Unlisted	CWH	FULL Attainment	NA	**Recreational Use** Reach found to contain adequate pool depth and area, PCR use is recommended. **Anti-Degregadation** **E and T species** none **Declining Species** L.Br.Lamprey (9) Brnd Madtom (2)

					Vunerability High **BioNarrative** V.Good **QHEI** >80 (0) 80-70 (0) ≤70 (100%) **Sensitive Species** 3 Species 8/0.3km (3%) **Multiple Attributes** Moderate ***Recommended Tier*:** GHQW
Comments: Given the presence of four coldwater invertebrate taxa and two coldwater fish taxa (including brown trout), the CWH designation is recommended for this Clear Creek tributary. The reach evaluated found to contain fish and benthic macroinvertebrate communities consistent with the interim biocriteria.					
Middle Hocking River I WAU: 0503020-050					
Hocking River (01-001)	**Aquatic Life Use**		**Indicators**	**Leading Causes/Sources of Aquatic Life use Impairment**	**Other Beneficial Uses/Tiers**
	Existing	**Rec.**			
RM 73.4-48.9 **Attainment** **Full:** 24.5 miles **Partial:** 0.0 miles **Non:** 0.0 miles **Length:** 24.5	WWH+	WWH	FULL Attainment	NA	**Recreational Use** PCR, verified **Anti-Degregadation** **E and T species** none **Declining Species** Brnd. Madtom (3) Mimic Shiner (1) Rosyface Sh. (16) **Vunerability** Moderate **BioNarrative** V.Good **QHEI** >80 (60%) 80-70 (20%) ≤70 (20%) **Sensitive Species** 14 Species 303/km (44%) **Multiple Attributes** Modrate-High ***Recommended Tier*:** SHQW (RM 69.6-51.4)
Comments: Reach evaluated found to contain fish and benthic macroinvertebrate communities consistent with applicable biocriteria.					
Harper Run				**Leading Causes/Sources**	**Other**

(01-041)	Aquatic Life Use		Indicators	of Aquatic Life use Impairment	Beneficial Uses/Tiers
	Existing	**Rec.**			
Attainment **Full:** 2.0 miles **Partial:** 0.0 miles **Non:** 0.0 miles **Length:** 2.0	WWH*	WWH	FULL Attainment	NA	**Recreational Use** PCR, Reach found to contain adequate pool depth and area, PCR use is recommended. **Anti-Degregadation** **E and T species** none **Declining Species** L.Br.Lamprey (7) **Vunerability** High **BioNarrative** M.Good (bugs only) **QHEI** none **Multiple Attributes** Low ***Recommended Tier*:** GHQW
Comments: Attainment status based upon macro-benthos alone. Reach evaluated found to contain a benthic macroinvertebrate community consistent with applicable biocriteria.					
Scott Creek (01-037)	**Aquatic Life Use**		**Indicators**	**Leading Causes/Sources of Aquatic Life use Impairment**	**Other Beneficial Uses/Tiers**
	Existing	**Rec.**			
Attainment **Full:** 0.2 miles **Partial:** 8.8 miles **Non:** 0.0 miles **Length:** 9.0	WWH+	WWH	PARTIAL Attainment **Headwaters to RM 0.2** ***RM 8.2:*** -Fair Fish/Good Bugs -WWH QHEI(66.5) -DO variable (6.6-10) -Low Nutrients and NH_3-N -Low pH (Min 6.5, mean 6.9) -TDS (elevated) - Sulfate (=background) -Condt. (elevated) -Mn (elevated) -Al (<background) -F. coliform (<background) ***RM 5.6:*** -Fair Fish/MG Bugs -Near WWH QHEI (55.5) -Low pH (min 6.4, mean 6.7) -DO (min 6.1, mean 7.8) -Low Nutrients and NH3-N -TDS (<background) -Sulfate(<background) -Condt. (<background) -Mn (<background) -Al (<background)	**Cause(s):** Low pH, TDS, Isolation (other), and Unknown **Source(s):** AMD, Unknown, and/or Natural (isolation) **Cumulative Impaired Miles** ***Cause*s** -Low Ph (6.9 miles) -TDS (3.4 miles) -Isolation (8.8 miles) -Unknown (8.8 miles) ***Sources*** -AMD (6.9 miles) -Unknown (8.8 miles) -Natural (8.8 miles)	**Recreational Use** PCR, verified **Anti-Degregadation** **E and T species** none **Declining Species** L.Br.Lamprey (18) Brnd Madtom (5) Rosyface Sh. (17) S.R.B. Dace (44) **Vunerability** Moderate **BioNarrative** Fair/Good **QHEI** >80 (0) 80-70 (50%) ≤70 (50%) **Sensitive Species** 12 Species 36/0.3km (6%) **Multiple Attributes** Low

			-F. coliform (<background) ***RM 2.1:*** -Fair Fish/Good Bugs -EWH QHEI (77.5) -Low pH (min 6.9, mean 7.0) -DO (min 5.8, mean 7.5) -Nutrients (<=background) -TDS (<=background) - Sulfate (<= background) - Condt. (<background)) - Mn (Elevated) - Al (background) - F. coliform (minor exceedence) FULL Attainment RM 0.2 to mouth		***Recommended Tier*:** SHQW Note: As the majority of sensitive and declining species are concentrated in the lower reach, the SHQW anti-deg. recommendation is limited to the lower mile of Scott Creek.
Comments: As identified in prior assessments (Ohio EPA 1995 TSD), associated causes and sources of aquatic life use impairment were not entirely clear in 2004 results. Adequate physical habitat was observed throughout. DO, nutrients (including ammonia-N), demand parameters, and fecal coliform counts were largely at or below regional norms. Selected environmental parameters suggested modest AMD influence within the headwaters, evidenced by depressed pH regime (including one WWH violation, pH 6.4) and elevated specific conductance, TDS, and Mn. However, the performance of these parameters and ambient biology were not indicative of profoundly degraded conditions. Aquatic life use impairment was driven solely by performance of the fish (no better than fair). Typically, the macrobenthos displays a greater sensitivity to the effects of chronic sub lethal or otherwise modest AMD loads. As most of the length of Scott Creek is isolated from the Hocking River (and the lower ~0.2 miles of the mainstem) by substantial escarpment; it is possible that historic impacts, derived from previous mining activities within the head waters, have yet to fully recover due a barrier to natural reintroduction of fish. The lower reach of Scott Creek (connected to the Hocking River), has consistently supported WWH aquatic communities through several EPA assessment cycles.					
Clear Fork (01-038)	**Aquatic Life Use**		**Indicators**	**Leading Causes/Sources of Aquatic Life use Impairment**	**Other Beneficial Uses/Tiers**
	Existing	**Rec.**			
Scott Creek Trib. **Attainment** **Full:** 1.1 miles **Partial:** 3.9 miles **Non:** 0.0 miles **Length:** 5.0	EWH*	WWH	PARTIAL Attainment **Headwaters to RM1.1** -Fair Fish/MG Bugs -Poor QHEI (45.5) -DO (skewed to high values) -Nitrate (highly elevated) -TKN (<=background) -pH (7-7.8, mean 7.4) -NH_3-N(<=background) -Condt. (=background) -Sulfate (<background) -F.coliform (<background) FULL Attainment Remaining segment	**Cause(s):** Direct Habitat, Alteration, and Nutrient Enrichment **Source(s):** Agriculture (Row Crop), Channelization, Impoundment (Lake Logan)and Riparian Encroachment /Removal	**Recreational Use** Adequate pool depth and area to support the PRC use. **Anti-Degregadation** **E and T species** none **Declining Species** L.Br.Lamprey (4) S.R.B. Dace (18) **Vunerability** Low **BioNarrative** M.Good **QHEI** >80 (0) 80-70 (0) ≤70 (100%) **Sensitive Species** 4 Species 20/0.3km (2%) **Multiple Attributes** Low ***Recommended***

					***Tier*:** GHQW
Comments: Originally designated EWH as part of the 1978 WQS. These early designation were not based upon a robust data driven analysis, and as such are considered unverified. Based upon the 2004 assessment, Clear Fork was found not to possess or have the potential to support an exceptional assemblage of fish and benthic macroinvertebrates. As such, the WWH aquatic life use is recommended for all free flowing segments. The EWH aquatic life use will be retained for the impounded stream reach formed by the Lake Logan, a public lake. Compared against the recommended WWH biocriteria, aquatic life use impairment within the headwaters of Clear Fork (RM 4.8) was by no means profound. Departure from the applicable biocriteria was due solely to the fish community, which performed just below the applicable biocriterion. Impacts to this assemblage appeared associated with degraded stream habitat (channelization, riparian encroachment, siltation) and to a lesser extent nutrient enrichment. The remaining downstream segment was found to contain a community of fish and benthic macroinvertebrate fully consistent with the applicable WWH biocriteria.					
Duck Creek (01-039)	**Aquatic Life Use**		**Indicators**	**Leading Causes/Sources of Aquatic Life use Impairment**	**Other Beneficial Uses/Tiers**
	Existing	**Rec.**			
Clear Fork Trib. **Attainment** **Full:** 2.0 miles **Partial:** 0.0 miles **Non:** 0.0 miles **Length:** 2.0	EWH*	WWH	FULL Attainment	NA	**Recreational Use** Reach found to contain adequate pool depth and area, PCR use is recommended. **Anti-Degregadation** **E and T species** none **Declining Species** L.Br.Lamprey (15) **Vunerability** High **BioNarrative** M.Good **QHEI** >80 (0) 80-70 (0) ≤70 (100%) **Multiple Attributes** Low ***Recommended Tier*:** GHQW
Comments: Originally designated EWH (unverified) as part of the 1978 WQS. Based upon the 2004 assessment, Duck Creek was found not to possess or have the potential to support an exceptional assemblage of fish and benthic macroinvertebrates. As such, the WWH aquatic life use is recommended. Based upon the recommended WWH aquatic life use, Duck Creek was found to contain fish and benthic macroinvertebrate communities consistent with applicable biocriteria.					
Dry Run (01-040)	**Aquatic Life Use**		**Indicators**	**Leading Causes/Sources of Aquatic Life use Impairment**	**Other Beneficial Uses/Tiers**
	Existing	**Rec.**			
Scott Creek Trib.	WWH*	WWH	FULL Attainment	NA	**Recreational Use** Reach found to

Attainment **Full:** 1.0 miles **Partial:** 0.0 miles **Non:** 0.0 miles **Length:** 1.0					contain adequate pool depth and area, PCR use is recommended. **Anti-Degregadation** **E and T species** none **Declining Species** L.Br.Lamprey (3) **Vunerability** High **BioNarrative** Good **QHEI** >80 (0) 80-70 (0) ≤70 (100%) **Multiple Attributes** Low ***Recommended Tier*:** GHQW
Comments: Reach evaluated found to contain fish and benthic macroinvertebrate communities consistent with applicable biocriteria.					
UN Dry Run Trib. @ RM 1.48 (01-060)	**Aquatic Life Use**		**Indicators**	**Leading Causes/Sources of Aquatic Life use Impairment**	**Other Beneficial Uses/Tiers**
	Existing	**Rec.**			
Dry Run Trib. **Attainment** **Full:** 0.0 miles **Partial:** 1.0 miles **Non:** 0.0 miles **Length:** 1.0	Unlisted	WWH	PARTIAL Attainment -Fair Fish/G Bugs -WWH QHEI (57.5) -DO(swing 6.5-9.8, mean 7.7) -Nutrients (some elevated) -NH_3-N (=background) -low pH (6.8-7.4, mean 7.0) -TDS (<background) -Sulfate (<background) -Mn (slight elevation) -Al (<=background) -Condct. (<background) -F. coliform (<background)	**Cause(s):** Sedimentation (silt) **Source(s):** Stream bank Destabilization and Riparian Encroachment/Removal	**Recreational Use** Reach found to contain adequate pool depth and area, PCR use is recommended. **Anti-Degregadation** **E and T species** none **Declining Species** L.Br.Lamprey (2) S.R.B Dace (14) **Vunerability** Moderate **BioNarrative** Fair/Good **QHEI** >80 (0) 80-70 (0) ≤70 (100%) **Multiple Attributes** Low ***Recommended Tier*:** GHQW

Comments: Aquatic life use impairment through this unnamed Dry Run Tributary was by no means profound. Departure from the applicable biocriteria was due solely to fish community, which performed just below the applicable biocriterion. As measured by the QHEI, aggregated macrohabitat quality was characterized as marginal good. Habitat deficiencies included high overall siltation, substrate embeddedness, and limited channel devolvement, and appeared the principal associated causes/sources of aquatic life use impairment.					
Oldtown Creek (01-036)	**Aquatic Life Use**		**Indicators**	**Leading Causes/Sources of Aquatic Life use Impairment**	**Other Beneficial Uses/Tiers**
	Existing	**Rec.**			
Attainment **Full:** 5.0 miles **Partial:** 0.0 miles **Non:** 0.0 miles **Length:** 5.0	WWH+	WWH	FULL Attainment	NA	**Recreational Use** Reach found to contain adequate pool depth and area, PCR use is recommended. **Anti-Degregadation** **E and T species** none **Declining Species** L.Br.Lamprey (22) **Vunerability** High **BioNarrative** Good/M.Good **QHEI** >80 (0) 80-70 (0) ≤70 (100%) **Multiple Attributes** Low ***Recommended Tier*:** GHQW
Comments: Reach evaluated found to contain fish and benthic macroinvertebrate communities consistent with applicable biocriteria.					
UN Oldtown Cr. Trib. @ RM 4.25 (01-059)	**Aquatic Life Use**		**Indicators**	**Leading Causes/Sources of Aquatic Life use Impairment**	**Other Beneficial Uses/Tiers**
	Existing	**Rec.**			
Attainment **Full:** 1.0 miles **Partial:** 0.0 miles **Non:** 0.0 miles **Length:** 1.0	Unlisted	WWH	FULL Attainment	NA	**Recreational Use** Reach found to contain adequate pool depth and area, PCR use is recommended. **Anti-Degregadation** **E and T species** none **Declining Species** L.Br.Lamprey (8) S.R.B Dace (7) **Vunerability** High

					BioNarrative Good **QHEI** >80 (0) 80-70 (0) ≤70 (100%) **Multiple Attributes** Low ***Recommended Tier*:** GHQW
Comments: Reach evaluated found to contain fish and benthic macroinvertebrate communities consistent with applicable biocriteria.					
Threemile Cr. (01-034)	**Aquatic Life Use**		**Indicators**	**Leading Causes/Sources of Aquatic Life use Impairment**	**Other Beneficial Uses/Tiers**
	Existing	**Rec.**			
Attainment **Full:** 0.0 miles **Partial:** 4.0 miles **Non:** 0.0 miles **Length:** 4.0	WWH*	WWH	PARTIAL Attainment -Fair Fish/MG Bugs -Fair-poor QHEI -DO(modest depression) -Nutrients (=background) -NH_3-N (slight elevation) -BOD (<=background) -low pH (6.7-7.2, mean 7.0) -TDS (<background) -Sulfate (<background) -Mn (background) -AL (<background) -Condct. (<background) -F. coliform (PCR exceedence)	**Cause(s):** Sedimentation (silt) and Direct Habitat Alteration (previous channelization) **Source(s):**Open Pasture Land, Riparian Removal/Encroachment, and Channelization (previous)	**Recreational Use** Reach found to contain adequate pool depth and area, PCR use is recommended. **Anti-Degregadation** **E and T species** none **Declining Species** L.Br.Lamprey (17) S.R.B Dace (2) **Vunerability** Low **BioNarrative** Fair/M.Good **QHEI** >80 (0) 80-70 (0) ≤70 (100%) **Multiple Attributes** Low ***Recommended Tier*:** GHQW
Comments: Aquatic life use impairment through Threemile Creek was by no means profound. Departure from the applicable biocriteria was due solely to fish community, which performed just below the applicable biocriterion. As measured by the QHEI, aggregated macrohabitat quality was characterized as marginal good. Habitat deficiencies included high overall siltation, substrate embeddedness, and limited channel devolvement. Impacts to the fish assemblage were the result of deficient macrohabitat.					
Fivemile Cr. (01-033)	**Aquatic Life Use**		**Indicators**	**Leading Causes/Sources of Aquatic Life use Impairment**	**Other Beneficial Uses/Tiers**
	Existing	**Rec.**			
	WWH*	WWH	PARTIAL Attainment	**Cause(s):** Sedimentation	**Recreational Use**

Attainment **Full:** 1.0 miles **Partial:** 3.0 miles **Non:** 0.0 miles **Length:** 4.0			**Headwaters to RM 1.0** Fair Fish/MG Bugs -Poor QHEI -DO(5.3-8.3, mean 7.2) -Nutrients (=background) -NH_3-N(=background) -BOD (<background) -Low pH (6.7-7.2, mean 7.0) -TDS (elevated 568-246) -Sulfate (slight elevation) -Mn (<background) -AL (<background) -Condtc. (<background) -F. coliform (1 PCR exceedence) <u>FULL Attainment</u> **RM 1.0 to Mouth**	(silt) and possible Organic Enrichment (livestock) **Source(s):** Open Pastureland, Riparian Removal/Encroachment, and Streambank Destabilization.	Reach found to contain adequate pool depth and area, PCR use is recommended. **<u>Anti-Degregadation</u>** **E and T species** none **Declining Species** L.Br.Lamprey (5) S.R.B Dace (5) **Vunerability** Moderate **BioNarrative** Fair/M.Good **QHEI** >80 (0) 80-70 (0) ≤70 (100%) **Multiple Attributes** Low ***Recommended Tier*:** GHQW
Comments: Aquatic life use impairment within the headwaters of Fivemile Creek was by no means profound. Departure from the applicable biocriteria was due solely to the fish community, which performed just below the applicable biocriterion. Impacts to the fish assemblage appeared associated with simplified or otherwise disturbed habitat features (riparian encroachment, false banks, siltation, and substrate embeddedness) and to a lesser extent organic enrichment. The headwaters course through open pasture. Through these areas, livestock access is unrestricted and cattle were observed in-stream. The modest impact observed, appeared associated with physical damage to stream habitat associated with open livestock access and chemical impacts attributed to the same. The remaining downstream segment was found to contain a community of fish and benthic macroinvertebrate fully consistent with the applicable WWH biocriteria.					
UN Fivemile Cr. Trib.@ RM 3.44 (01-058)	**Aquatic Life Use**		**Indicators**	**Leading Causes/Sources of Aquatic Life use Impairment**	**Other Beneficial Uses/Tiers**
	Existing	**Rec.**			
Attainment **Full:** 1.0 miles **Partial:** 0.0 miles **Non:** 0.0 miles **Length:** 1.0	Unlisted	WWH	Full Attainment	NA	**<u>Recreational Use</u>** Reach found to contain adequate pool depth and area, PCR use is recommended. **<u>Anti-Degregadation</u>** **E and T species** none **Declining Species** S.R.B Dace (5) **Vunerability** Moderate **BioNarrative** Fair/Good **QHEI** >80 (0)

					80-70 (0) ≤70 (100%) **Multiple Attributes** Low ***Recommended Tier*:** GHQW
Comments: Reach evaluated found to contain fish and benthic macroinvertebrate communities consistent with applicable biocriteria.					
UN Hocking Trib. @ RM 62.18 (01-061)	**Aquatic Life Use**		**Indicators**	**Leading Causes/Sources of Aquatic Life use Impairment**	**Other Beneficial Uses/Tiers**
	Existing	**Rec.**			
Attainment **Full:** 2.0 miles **Partial:** 0.0 miles **Non:** 0.0 miles **Length: 2.0**	Unlisted	WWH	FULL Attainment	NA	**Recreational Use** Reach found to contain adequate pool depth and area, PCR use is recommended. **Anti-Degregadation** **E and T species** none **Declining Species** L.Br.Lamprey (7) S.R.B Dace (3) **Vunerability** Moderate **BioNarrative** M.Good/Good **QHEI** >80 (0) 80-70 (0) ≤70 (100%) **Multiple Attributes** Low ***Recommended Tier*:** GHQW
Comments: Reach evaluated found to contain fish and benthic macroinvertebrate communities consistent with applicable biocriteria.					
Minkers Run (01-031)	**Aquatic Life Use**		**Indicators**	**Leading Causes/Sources of Aquatic Life use Impairment**	**Other Beneficial Uses/Tiers**
	Existing	**Rec.**			
Attainment **Full:** 0.0 miles **Partial:** 0.0 miles **Non:** 1.0 miles **Length: 1.0**	WWH*	WWH	NON Attainment -Fair Fish/Poor Bugs -WWH QHEI (59.5) -DO(7.1-9.7, mean 8.6) -Nutrients (~background) -NH_3-N(>background, *Wetland*) -BOD (<background) -Low pH (6.4-7.4, mean 6.9) -TDS (elevated)	**Cause(s):**Low pH, TDS, and Direct Habitat Mods. **Source(s):** AMD and Natural (beavers/wetlands)	**Recreational Use** Adequate pool depth and area, to support the PCR use. Additionally, numerous private residences adjacent to a portion of Minkers Run.

			-Sulfate (elevated) -Mn (highly elevated) -AL (highly elevated) -Condct. (elevated) -F.coliform (<background)		**Anti-Degregadation** **E and T species** none **Declining Species** none **Vunerability** Low **BioNarrative** Fair/Poor **QHEI** >80 (0) 80-70 (0) ≤70 (100%) **Multiple Attributes** Low ***Recommended Tier*:** GHQW
Comments: Aquatic life use impairment for Minkers Run was derived from the combined influences of AMD and natural processes, the latter attributable to beaver. Much of the length of Minkers Run is dramatically affected by numerous beaver dams, and has converted most of the stream length to a sprawling wetland complex. Chemical monitoring clearly indicated a strong AMD influence: low pH (values as low as 6.4), highly elevated Al and manganese, elevated TDS and specific conductance. Chemical indicators of the wetland "effect" included elevated ammonia-N.					
Middle Hocking River II HUC: 0503020-080					
Hocking River (01-001)	**Aquatic Life Use**		**Indicators**	**Leading Causes/Sources of Aquatic Life use Impairment**	**Other Beneficial Uses/Tiers**
	Existing	**Rec.**			
RM 48.9-32.0 **Attainment** **Full:** 16.9 miles **Partial:** 0.0 miles **Non:** 0.0 miles **Length: 16.9**	WWH+	WWH	FULL Attainment	NA	**Recreational Use** PCR **Anti-Degregadation** **E and T species** none **Declining Species** Brnd Madtom (3) Mimic Sh. (13) **Vunerability** Moderate **BioNarrative** V.Good **QHEI** >80 (0) 80-70 (0) ≤70 (100%) **Sensitive Species** 17 Species 92/km (20%) **Multiple Attributes** Moderate ***Recommended Tier*:** GHQW Note: Possible SHQW

					candidate
Comments: Reach evaluated found to contain fish and benthic macroinvertebrate communities consistent with applicable biocriteria.					
UN Hocking Trib. @ RM 48.7 (01-068)	**Aquatic Life Use**		**Indicators**	**Leading Causes/Sources of Aquatic Life use Impairment**	**Other Beneficial Uses/Tiers**
	Existing	**Rec.**			
Attainment **Full:** 0.0 miles **Partial:** 0.0 miles **Non:** 1.0 miles **Length: 1.0**	Unlisted	LRW	- VP Fish/ VP Bugs* -Poor QHEI -DO(=background) -Nutrients (<background) -NH_3-N (>background) -BOD (<background) -pH (3.5-5.3, mean 4.0) -Alk. (well below background) -TDS (elevated) -Sulfate (elevated) -Mn (extremely elevated) -AL (extremely elevated) -Condtc. (elevated) -F.coliform (<background) * - As no aquatic life use is recommended for this stream, attainment status is not listed.	**Cause(s):**Low pH (all values below WQS) **Source(s):** AMD	**Recreational Use** Reach found to contain adequate pool depth and area, PCR use is recommended. **Anti-Degregadation** **E and T species** none **Declining Species** none **Vunerability** Low **BioNarrative** Poor/V.Poor **QHEI** >80 (0) 80-70 (0) ≤70 (100%) **Multiple Attributes** Low ***Recommended Tier*:** LQW
Comments: This unnamed Hocking River Tributary was found profoundly impacted by mine drainage. Both the fish and benthic macroinvertebrate communities yielded narrative evaluations of very poor. All chemical AMD indicators were either highly elevated (Mn, Al, Sulfate, TDS, etc.), or otherwise strongly deviated from regional norms. Most notably, all pH measurements were well below the WWH criterion, including values as low as 3.5. Although, macrohaibtat quality was poor, the effects of AMD superseded this important measure of environmental quality. Despite these findings, a recommendation regarding the appropriate aquatic life use designation for this previously unassessed waterbody, will be withheld or postponed until the next reporting cycle. Therefore, the ambient biological narrative will serve as the sole assessment of this stream in lieu of attainment status (Full, Partial, and Non). In the absence of an aquatic life use designation, this stream will not be included in the biannual integrated report (305b).					
Hamley Run (01-030)	**Aquatic Life Use**		**Indicators**	**Leading Causes/Sources of Aquatic Life use Impairment**	**Other Beneficial Uses/Tiers**
	Existing	**Rec.**			
Attainment **Full:** 0.0 miles **Partial:** 0.4 miles **Non:** 2.6 miles	WWH*	WWH	NON Attainment **Headwaters to RM 0.4** -Fair Fish/Poor Bugs -WWH QHEI -DO(6.4-9.3, mean 7.7)	**Cause(s):** Nutrients, Organic Enrichment/Low DO [primary causes] and Sedimentation (sand) [secondary or tertiary]	**Recreational Use** Adequate pool depth and area to support the PCR use.

Length: 3.0			-Nutrients (=background) -NH_3-N (=background) -BOD (<background) -pH (6.7-7.5, mean 7.1) -TDS (<background) -Sulfate (<background) -Mn (<background) -Al (=background) -Condtc. (<background) -F.coliform(<background) <u>PARTIAL Attainment</u> **RM 0.4 to mouth** -Good Fish/Fair Bugs -WWH QHEI -DO(3.1-8.4, mean 7.0) -Nutrients (highly elevated) -NH_3-N v(highly elevated -BOD (~background) -pH (6.7-7.3, mean 7.0) -TDS (<background) -Sulfate (<background) -Mn (elevated) -Al (elevated) -Condtc. (1 highly elevated) -F.coliform (highly elevated, all exceeded, PCR, 14000-4500)	**Source(s):** Spill Event [primary], and Riparian Removal/Encroachment. **<u>Cumulative Impaired Miles</u>** ***Cause***s -Nutrients (1 mile) -Organic Enrich.(1.0 mile) -Sediment [sand] (2.0 miles) ***Sources*** -Spill Event (1.0 mile) -Riparian Encrh. (2.0 miles)	Recreational use impaired, as no F. coliform count was found below 4500, with values as high as 14,000. **<u>Anti-Degregadation</u>** **E and T species** none **Declining Species** L.Br.Lamprey (73) **Vunerability** Low **BioNarrative** M.Good/Fair **QHEI** >80 (0) 80-70 (0) <u>≤</u>70 (100%) **Multiple Attributes** Low ***Recommended Tier*:** GHQW

Comments: Impacted communities and WQ for Hamley Run were attributed to a break in The Plains POTW collection system that resulted in a large release of untreated wastewater. This event simply overwhelmed Hamley Run with vast qualities of untreated wastewater. The fish sampling effort predated the spill event, and thus explains the discrepancies between the macro-benthos, fish, and WQ results. Impairment upstream of the spill event was delineated by the macro-benthos alone. Poor community performance was attributed to impacted natural subtrates.

Sugar Creek (01-028)	**Aquatic Life Use**		**Indicators**	**Leading Causes/Sources of Aquatic Life use Impairment**	**Other Beneficial Uses/Tiers**
	Existing	**Rec.**			
Attainment **Full:** 3.0 miles **Partial:** 0.0 miles **Non:** 0.0 miles **Length: 3.0**	WWH*	WWH	FULL Attainment	NA	**<u>Recreational Use</u>** Adequate pool depth and area to support the PCR use. **<u>Anti-Degregadation</u>** **E and T species** none **Declining Species** L.Br.Lamprey (10) **Vunerability** High **BioNarrative** M.Good **QHEI** >80 (0) 80-70 (0) <u>≤</u>70 (100%) **Multiple Attributes** Low

					***Recommended Tier*:** GHQW
Comments: Reach evaluated found to contain fish and benthic macroinvertebrate communities consistent with applicable biocriteria.					
Factory Creek (01-025)	**Aquatic Life Use**		**Indicators**	**Leading Causes/Sources of Aquatic Life use Impairment**	**Other Beneficial Uses/Tiers**
	Existing	**Rec.**			
Attainment **Full:** 0.0 miles **Partial:** 4.0 miles **Non:** 0.0 miles **Length: 4.0**	WWH*	WWH	PARTIAL Attainment -Fair Fish/G-MG Bugs -WWH QHEI (61.5-70.5) -DO(background) -Nutrients (=background) -NH_3-N (background) -BOD (=background) -pH (7.5-6.7, mean 7.1) -TDS (=background) -Sulfate (<background) -Mn (<background) -AL (=background) -Condct. (background) -F.coliform (<background)	**Cause(s):** Sedimentation (sand, high bedload, shifting and unstable substrates, limited channel development) **Source(s):**Bank Destabilization, and Natural	**Recreational Use** Adequate pool depth and area to support the PCR use. **Anti-Degregadation** **E and T species** none **Declining Species** L.Br.Lamprey (2) **Vunerability** Moderate **BioNarrative** Fair/M.Good **QHEI** >80 (0) 80-70 (50%) ≤70 (50%) **Multiple Attributes** Low ***Recommended Tier*:** GHQW
Comments: Aquatic life use impairment through Factory Creek was by no means profound. Departure from the applicable biocriteria was due solely to fish community, which performed just below the applicable biocriterion. All water quality parameters appeared consistent with natural background conditions. The fish assemblage appeared most affected by habitat conditions, specifically substrate quality. Generally, the Margaret Creek basin appeared both unstable and to have a high natural potential to yield and export sand/gravel to the principal conveyances. Channel incision, through bed degradation and lateral scour, rather than direct human modification, was common. This condition limits channel and substrate diversity, and effectively disconnects the stream from its adjacent flood plain. As such, fine bedload materials are retained in the channel, rather than being regularly dispersed into the flood plain during elevated flows. The concentration of relatively fine grained bedload greatly simplifies channel habitat and causes riffles to be only temporary features due to the fact that they are frequently scoured away.					
Margaret Cr. (01-024)	**Aquatic Life Use**		**Indicators**	**Leading Causes/Sources of Aquatic Life use Impairment**	**Other Beneficial Uses/Tiers**
	Existing	**Rec.**			
Attainment **Full:** 3.3 miles	EWH* and WWH*	WWH	NON Attainment **Headwaters to RM 8.6** -Fair Fish/Fair Bugs	**Cause(s):** Sedimentation (high bedload, shifting and unstable substrates, limited	**Recreational Use** Adequate pool depth and area to support

Partial: 5.3 miles **Non:** 3.4 miles **Length: 12.0**			-WWH QHEI (55.5) -DO(background) -Nutrients (elevated) -NH_3-N(elevated) -BOD (slight elevation) -pH (very stable, mean 7.4) -TDS (~background) -Sulfate (background) -Mn (elevated) -Al (background) -Condtc (~background) -F.coliform (1 PCR exceedence) PARTIAL Attainment **RM 8.6 to 3.3** -Fair Fish/G-MG Bugs -Marginal QHEI (40.5-49.0) -DO(depressed, 5.8-7.5) -Nutrients (elevated) -NH_3-N (elevated) -BOD (elevated) -pH (stable, mean 7.4) -TDS (<background) -Sulfate (<background) -Mn (~background) -Al (elevated) -Condtc (=background) -F.coliform (2 PCR exceedences) FULL Attainment **RM 3.3 to mouth**	channel development) **Source(s):**Bank Destabilization, Riparian Removal/Encroachment, and Open Pasture Land, and Natural (sediment and instability)	the PCR use. **Anti-Degregadation** **E and T species** none **Declining Species** none **Vunerability** Low **BioNarrative** Fair/M.Good **QHEI** >80 (0) 80-70 (0) ≤70 (100%) **Multiple Attributes** Low ***Recommended Tier*:** GHQW

Comments: Originally the headwaters of Margaret Creek were designated EWH (unverified) as part of the 1978 WQS. Based upon the 2004 assessment, Margaret Creek was found not to possess or have the potential to support an exceptional assemblage of fish and benthic macroinvertebrates. As such, the WWH aquatic life use is recommended for the entire length.

The Margaret Creek subbasin appears to have a high natural potential to export sand/gravel bedload. The channel was often incised, through bed degradation and lateral scour, rather than direct human modification. These conditions limit channel and substrate diversity, and effectively disconnect the stream from its adjacent floodplain. As such, bedload materials are retained in the channel, rather than being regularly dispersed into the flood plain during elevated flows. It appears that unrestricted cattle access served to locally exacerbate the existing instability and other attendant problems.

West Branch Margaret Creek (01-027)	**Aquatic Life Use**		**Indicators**	**Leading Causes/Sources of Aquatic Life use Impairment**	**Other Beneficial Uses/Tiers**
	Existing	**Rec.**			
Attainment **Full:** 0.0 miles **Partial:** 3.0 miles **Non:** 0.0 miles **Length: 3.0**	WWH*	WWH	PARTIAL Attainment -MG-Fair Fish/Fair-G Bugs -Very poor QHEI -DO(depressed, min 3.1) -Nutrients (=background) -NH_3-N (~elevated) -BOD (<background) -low pH (6.6-7.3, mean 6.8) -pH (~background) low -TDS (<background) -Sulfate (<background) -Mn (=background) -Al (=background) -Condct. (<background)	**Cause(s):** Low DO, Sedimentation (silt), Direct Habitat Mod, and Flow Alteration (low flow) **Source(s):** Riparian Removal/Encroachment, Bank Destabilization, Upstream Impoundment (Fox Lake), and Channelization (historic)	**Recreational Use** Reach found to contain adequate pool depth and area, PCR use is recommended. **Anti-Degregadation** **E and T species** none **Declining Species** none **Vunerability** Moderate

			-F.coliform (~background)		**BioNarrative** M.Good **QHEI** >80 (0) 80-70 (0) ≤70 (100%) **Multiple Attributes** Low ***Recommended Tier*:** GHQW
Comments: Singularly or in combination, the fish and benthic macroinvertebrate communities indicated Aquatic Life Use impairment through the entire length of West Branch Margaret Creek. In-stream biology appeared most affected by poor physical habitat. The channel was largely monotonous and deeply incised and appeared to have been modified in the past. Substrates were principally composed of silt. The negative effects of degraded macrohabitat were exacerbated by diminished stream flow associated with an impoundment located upstream from the upper most West Branch Margaret Creek sampling station.					
Biddle Creek (01-073)	**Aquatic Life Use**		**Indicators**	**Leading Causes/Sources of Aquatic Life use Impairment**	**Other Beneficial Uses/Tiers**
	Existing	**Rec.**			
Attainment **Full:** 0.0 miles **Partial:** 2.0 miles **Non:** 0.0 miles **Length: 2.0**	Unlisted	WWH	PARTIAL Attainment -Fair Fish/MG Bugs -Fair QHEI(53.5) -DO(5.0-7.0, mean 6.0) -Nutrients (~elevated) -NH_3-N (elevated) -BOD (highly elevated) -pH (6.8-7.5, mean 7.1) -TDS (<background) -Sulfate (<background) -Mn (elevated)` -Al (elevated) -Condct. (=background) -F.coliform (=background)	**Cause(s):** Sedimentation (sand), Low DO, Nutrient Enrichment, and possibly modest AMD (tertiary) **Source(s):** Riparian Removal/Encroachment, Other (adjacent golf course-source of nutrients and ammonia)	**Recreational Use** Reach found to contain adequate pool depth and area, PCR use is recommended. **Anti-Degregadation** **E and T species** none **Declining Species** none **Vunerability** Moderate **BioNarrative** Fair/M.Good **QHEI** >80 (0) 80-70 (0) ≤70 (100%) **Multiple Attributes** Low ***Recommended Tier*:** GHQW
Comments: Fish community performance alone delineated aquatic life use impairment in Biddle Creek, and appeared most affected by poor physical habitat. The channel was largely monotonous, deeply incised, and appeared to have been modified in the past. Substrates were principally composed of silt. An adjacent Golf Course appeared the likely source of nutrients, ammonia-N, and thus low DO and elevated BOD. Selected AMD parameters were elevated, suggesting some AMD influence, but this was considered at most tertiary.					
Federal Creek HUC: 0503020-090					
Federal Creek (01-100)	**Aquatic Life Use**			**Leading Causes/Sources**	**Other**

	Existing	Rec.	Indicators	of Aquatic Life use Impairment	Beneficial Uses/Tiers
Attainment **Full:** 17.0 miles **Partial:** 0.0 miles **Non:** 0.0 miles **Length: 17.0**	EWH+	EWH	FULL Attainment	NA	**Recreational Use** Adequate pool depth and area to support the PCR use. **Anti-Degregadation** **E and T species** none **Declining Species** L.Br.Lamprey (2) S.R.B Dace (14) **Vunerability** Moderate **BioNarrative** Fair/Good **QHEI** >80 (0) 80-70 (25%) ≤70 (75%) **Sensitive Species** 13 Species 204/0.3km (21%) **Multiple Attributes** Low ***Existing Tier*:** SHQW (RM 16.21-0.0)
Comments: Partial attainment of the EWH criteria was indicated for selected Federal Creek stations in 2004. However, this sampling was performed following significant flooding. Although biological monitoring was done after stream flows returned to normal levels, the magnitude of the flooding likely left the Federal Creek assemblages disrupted for the remainder of the 2004 field year. Given the uncertainty surrounding the 2004 results, selected sites were re-sampling during the 2006 field season to test validity of the impaired status. The results from the supplemental 2006 sampling efforts found all sites to perform at a level consistent with the EWH criterion. Therefore, based upon this, the entire length of Federal Creek was found to comport with the EWH aquatic life use designation.					
Hyde Fork (01-190)	**Aquatic Life Use**		**Indicators**	**Leading Causes/Sources of Aquatic Life use Impairment**	**Other Beneficial Uses/Tiers**
	Existing	**Rec.**			
Attainment **Full:** 2.0 miles **Partial:** 0.0 miles **Non:** 0.0 miles **Length: 2.0**	EWH*	WWH	FULL Attainment	NA	**Recreational Use** Adequate pool depth and area to support the PCR use. **Anti-Degregadation** **E and T species** none **Declining Species** S.R.B Dace (45) **Vunerability** High **BioNarrative** V.Good/M.Good **QHEI**

					>80 (0) 80-70 (0) ≤70 (100%) **Multiple Attributes** Low ***Recommended Tier*:** GHQW
Comments: Hyde Fork was originally designated EWH as part of the 1978 WQS. As this initial designation was, by definition, unverified, actual field data collected as part of the 2004 Hocking River basin and their resulting interpretation, supersedes the original classification. The results from said 2004 survey found that Hyde Fork did not demonstrate or possess reasonable potential to support and exceptional assemblage of aquatic organisms. Therefore the WWH aquatic life use is recommended for the entire length of Hyde Fork. Based upon the recommended WWH aquatic life use, the reach evaluated found to contain fish and benthic macroinvertebrate communities consistent with applicable biocriteria.					
Miners Fork (01-192)	**Aquatic Life Use**		**Indicators**	**Leading Causes/Sources of Aquatic Life use Impairment**	**Other Beneficial Uses/Tiers**
	Existing	**Rec.**			
Attainment **Full:** 3.0 miles **Partial:** 0.0 miles **Non:** 0.0 miles **Length: 3.0**	EWH*	WWH	FULL Attainment	NA	**Recreational Use** Adequate pool depth and area to support the PCR use. **Anti-Degregadation** **E and T species** none **Declining Species** L.Br.Lamprey (6) S.R.B Dace (36) **Vunerability** High **BioNarrative** Good **QHEI** >80 (0) 80-70 (0) ≤70 (100%) **Sensitive Species** 7 Species 28/0.3km (3%) **Multiple Attributes** Low-Moderate ***Recommended Tier*:** GHQW
Comments: Miners Fork was originally designated EWH as part of the 1978 WQS. As this initial designation was, by definition, unverified, actual field data collected as part of the 2004 Hocking River basin and their resulting interpretation, supersedes the original classification. The results from said 2004 survey found that Miners Fork did					

not demonstrate or possess reasonable potential to support and exceptional assemblage of aquatic organisms. Therefore the WWH aquatic life use is recommended for the entire length of Miners Fork.

Based upon the recommended WWH aquatic life use, the reach evaluated found to contain fish and benthic macroinvertebrate communities consistent with applicable biocriteria.

Kasler Creek (01-101)	**Aquatic Life Use**		**Indicators**	**Leading Causes/Sources of Aquatic Life use Impairment**	**Other Beneficial Uses/Tiers**
	Existing	**Rec.**			
Attainment **Full:** 1.6 miles **Partial:** 0.0 miles **Non:** 0.4 miles **Length: 2.0**	Unlisted	WWH	FULL Attainment Headwaters to RM 0.4 (fish only) NON Attainment RM 0.4 to mouth -Fair Bugs (bugs only) -DO (4.7-7.6, mean 6.5) -Nutrients(background) -NH_3-N (background) -BOD (background) -pH (7.3-7.7, mean 7.5) -TDS (<background) -Sulfate (<background) -Mn (<background) -Al (background) -Condct. (<background) -F.coliform (background)	**Cause(s):** Low DO and Flow Alteration (low flow near mouth). **Source(s):** Natural (losing stream, near mouth) **Note**: Fish RM1.8 and Bugs RM 0.4.	**Recreational Use** Adequate pool depth and area to support the PCR use. **Anti-Degregadation** **E and T species** none **Declining Species** S.R.B Dace (59) **Vunerability** Moderate **BioNarrative** V.Good (fish only) **QHEI** >80 (0) 80-70 (100%) ≤70 (0) Sensitive Species 2 Species 11/0.3km (1.1%) **Multiple Attributes** Low ***Recommended Tier*:** GHQW

Comments: Kasler Creek, like other Federal Creek tributaries, upstream from the McDougall Branch, was subject to varying degrees of sedimentation and minimal sustained dry weather flow. Kasler Creek supported a low quality macroinvertebrate assemblage, due largely to interstitial flow which limited both total taxa diversity and the number of sensitive taxa. The macro-benthos alone delineated aquatic life use impairment for the lower 0.4 miles.

Linscott Run (01-180)	**Aquatic Life Use**		**Indicators**	**Leading Causes/Sources of Aquatic Life use Impairment**	**Other Beneficial Uses/Tiers**
	Existing	**Rec.**			
Attainment **Full:** 0.8 miles **Partial:** 3.2 miles **Non:** 0.0 miles **Length: 4.0**	EWH*	WWH and PHWH	PARTIAL Attainment **Headwaters to RM 0.8** -Fair Fish/VG Bugs -WWH QHEI (68.0) NO Chem. data for impaired site! FULL Attainment **RM 0.8 to mouth**	**Upper Reach** **Cause(s)**:Natural (possible primary HWH or at minimum transitional area) **Source(s)**:Natural **Note**: No WQ data available from SEDO for impaired segment.	**Recreational Use** Adequate pool depth and area to support the PCR use. **Anti-Degregadation** **E and T species** none **Declining Species** S.R.B Dace (180) **Vunerability** Moderate **BioNarrative**

					Fair/Good **QHEI** >80 (0) 80-70 (50%) ≤70 (50%) **Multiple Attributes** Low ***Recommended Tier*:** GHQW
Comments: Originally designated EWH as part of the 1978 WQS. Based upon the results of the 2004 biosurvey, Linscott Run did not demonstrate, either through direct observation or rationally appraised of potential, the ability to consistently support an exceptional aquatic fauna. Gauged against the recommended WWH biocriteria, aquatic life use impairment was limited to the segment upstream from RM 0.8. This was attributed to stream size, as this reach appeared at or near the threshold of PHWH. Therefore, the associated causes and sources of impairment were considered natural and the upper reach of Linscott Creek is a candidate for PHWH designation. The lower reach, evaluated at RM 0.8 was found to support a community of aquatic organisms consistent with the recommended WWH aquatic life use designation, and it is so recommended.					
McDougall Br. (01-170)	**Aquatic Life Use**		**Indicators**	**Leading Causes/Sources of Aquatic Life use Impairment**	**Other Beneficial Uses/Tiers**
	Existing	**Rec.**			
Attainment **Full:** 5.0 miles **Partial:** 0.0 miles **Non:** 0.0 miles **Length: 5.0**	WWH+	WWH	FULL Attainment	NA	**Recreational Use** Adequate pool depth and area to support the PCR use. **Anti-Degregadation** **E and T species** none **Declining Species** L.Br.Lamprey (3) S.R.B Dace (89) **Vunerability** High **BioNarrative** V.Good **QHEI** >80 (0) 80-70 (0) ≤70 (100%) **Sensitive Species** 8 Species 115/0.3km (10%) **Multiple Attributes** Modest ***Recommended Tier*:** SHQW (Entire length)
Comments: Reach evaluated found to contain fish and benthic macroinvertebrate communities consistent with applicable biocriteria.					
Wyatt Run				**Leading**	

(01-171)	Aquatic Life Use		Indicators	Causes/Sources of Aquatic Life use Impairment	Other Beneficial Uses/Tiers
	Existing	**Rec.**			
McDougall Branch Trib. **Attainment** **Full:** 1.0 miles **Partial:** 0.0 miles **Non:** 0.0 miles **Length: 1.0**	EWH*	WWH	FULL Attainment	NA	**Recreational Use** Adequate pool depth and area to support the PCR use. **Anti-Degregadation** **E and T species** none **Declining Species** S.R.B Dace (48) **Vunerability** High **BioNarrative** M.Good/Exceptional **QHEI** >80 (0) 80-70 (0) ≤70 (100%) **Sensitive Species** 3 Species 12/0.3km (0.72%) **Multiple Attributes** Low-Moderate ***Recommended Tier*:** GHQW

Comments: Wyatt Run was originally designated EWH as part of the 1978 WQS. As this initial designation was, by definition, unverified, actual field data collected as part of the 2004 Hocking River basin and their resulting interpretation, supersedes the original classification. The results from said 2004 survey found that Wyatt Run did not demonstrate or possess reasonable potential to support and exceptional assemblage of aquatic organisms. Therefore the WWH aquatic life use is recommended for the entire length of Wyatt Run.

Based upon the recommended WWH aquatic life use, the reach evaluated found to contain fish and benthic macroinvertebrate communities consistent with applicable biocriteria.

Mush Run (01-172)	Aquatic Life Use		Indicators	Leading Causes/Sources of Aquatic Life use Impairment	Other Beneficial Uses/Tiers
	Existing	**Rec.**			
McDougall Branch Trib. **Attainment** **Full:** 2.0 miles **Partial:** 0.0 miles **Non:** 0.0 miles **Length: 2.0**	EWH*	WWH	FULL Attainment	NA	**Recreational Use** Adequate pool depth and area to support the PCR use. **Anti-Degregadation** **E and T species** none **Declining Species** L.Br.Lamprey (5) S.R.B Dace (1) **Vunerability** High **BioNarrative** Except/Good **QHEI**

					>80 (0) 80-70 (0) ≤70 (100%) **Sensitive Species** 7 Species 85/0.3km (4.6%) **Multiple Attributes** Moderate ***Recommended Tier*:** GHQW
Comments: Mush Run was originally designated EWH as part of the 1978 WQS. As this initial designation was, by definition, unverified, actual field data collected as part of the 2004 Hocking River basin and their resulting interpretation, supersedes the original classification. The results from said 2004 survey found that Mush Run did not demonstrate or possess reasonable potential to support and exceptional assemblage of aquatic organisms. Therefore the WWH aquatic life use is recommended for the entire length of Mush Run. Based upon the recommended WWH aquatic life use, the reach evaluated found to contain fish and benthic macroinvertebrate communities consistent with applicable biocriteria.					
Dutch Creek (01-176)	**Aquatic Life Use**		**Indicators**	**Leading Causes/Sources of Aquatic Life use Impairment**	**Other Beneficial Uses/Tiers**
	Existing	**Rec.**			
McDougal Branch Trib. **Attainment** **Full:** 2.0 miles **Partial:** 0.0 miles **Non:** 0.0 miles **Length: 2.0**	Unlisted	WWH	FULL Attainment	NA	**Recreational Use** Adequate pool depth and area to support the PCR use. **Anti-Degregadation** **E and T species** none **Declining Species** none **Vunerability** High **BioNarrative** V.Good/Good **QHEI** >80 (0) 80-70 (100%) ≤70 (0) **Multiple Attributes** Moderate ***Recommended Tier*:** GHQW
Comments: Reach evaluated found to contain fish and benthic macroinvertebrate communities consistent with applicable biocriteria.					
Bryson Br. (01-174)	**Aquatic Life Use**		**Indicators**	**Leading Causes/Sources of Aquatic Life use Impairment**	**Other Beneficial Uses/Tiers**
	Existing	**Rec.**			
	EWH*	WWH	FULL Attainment	NA	**Recreational Use**

Attainment **Full:** 2.0 miles **Partial:** 0.0 miles **Non:** 0.0 miles **Length: 2.0**					Adequate pool depth and area to support the PCR use. **Anti-Degregadation** **E and T species** none **Declining Species** S.R.B Dace (1) **Vunerability** High **BioNarrative** Good **QHEI** >80 (0) 80-70 (0) ≤70 (100%) **Multiple Attributes** Low ***Recommended Tier*:** GHQW
Comments: Bryson Branch was originally designated EWH as part of the 1978 WQS. As this initial designation was, by definition, unverified, actual field data collected as part of the 2004 Hocking River basin and their resulting interpretation, supersedes the original classification. The results from said 2004 survey found that Bryson Branch did not demonstrate or possess reasonable potential to support and exceptional assemblage of aquatic organisms. Therefore the WWH aquatic life use is recommended for the entire length of Bryson Branch. Based upon the recommended WWH aquatic life use, the reach evaluated found to contain fish and benthic macroinvertebrate communities consistent with applicable biocriteria.					
Sharps Fork (01-160)	**Aquatic Life Use**		**Indicators**	**Leading Causes/Sources of Aquatic Life use Impairment**	**Other Beneficial Uses/Tiers**
	Existing	**Rec.**			
Attainment **Full:** 11.0 miles **Partial:** 0.0 miles **Non:** 0.0 miles **Length: 11.0**	WWH+	WWH	FULL Attainment	NA	**Recreational Use** Adequate pool depth and area to support the PCR use. **Anti-Degregadation** **E and T species** none **Declining Species** L.Br.Lamprey (8) S.R.B Dace (4) **Vunerability** High **BioNarrative** V.Good **QHEI** >80 (0) 80-70 (16.7%) ≤70 (83.3%) **Sensitive Species** 9 Species 145/0.3km (22.2%) **Multiple Attributes** Moderate

					***Recommended Tier*:** SHQW (Entire length)
Comments: Reach evaluated found to contain fish and benthic macroinvertebrate communities consistent with applicable biocriteria.					
Opossum Run (01-161)	**Aquatic Life Use**		**Indicators**	**Leading Causes/Sources of Aquatic Life use Impairment**	**Other Beneficial Uses/Tiers**
	Existing	**Rec.**			
Attainment **Full:** 2.6 miles **Partial:** 0.0 miles **Non:** 2.4 miles **Length: 5.0**	EWH*	WWH	NON Attainment **Headwaters to RM 2.6** -Poor Fish/E Bugs -WWH QHEI (59.0) -DO (4.2-9.1, mean 8.0) -Condct. (=background) FULL Attainment **RM 2.6 to mouth**	**Cause(s):**Natural (possible primary HWH or at minimum transitional area), Low DO **Source(s):** Natural **Note**: Only field parameters available for impaired site (RM 4.1), but no lab analysis.	**Recreational Use** Adequate pool depth and area to support the PCR use. **Anti-Degregadation** **E and T species** none **Declining Species** L.Br.Lamprey (4) S.R.B Dace (238) **Vunerability** Moderate **BioNarrative** Fair/V.Good **QHEI** >80 (0) 80-70 (0) ≤70 (100%) **Sensitive Species** 6 Species 34/0.3/km (4%) **Multiple Attributes** Low ***Recommended Tier*:** GHQW
Comments: Originally designated EWH as part of the 1978 WQS, Opossum Run, failed to demonstrate, either through direct observation or rationally appraised potential, the ability to consistently support an exceptional aquatic fauna. Gauged against the recommended WWH biocriteria, aquatic life use impairment was limited to the segment upstream from RM 2.6. This was attributed to stream size, as this reach appeared, functionally, at or near the threshold of a primary headwater. Therefore, the associated causes and sources of impairment were considered natural and the upper reach of Opossum Run is a potential candidate for PHWH designation. The lower reach of Opossum Run was found to contain fish and benthic macroinvertebrate communities consistent with applicable biocriteria.					
Sulfur Run (01-134)	**Aquatic Life Use**		**Indicators**	**Leading Causes/Sources of Aquatic Life use Impairment**	**Other Beneficial Uses/Tiers**
	Existing	**Rec.**			
Attainment **Full:** 0.0 miles **Partial:** 1.0 miles	Unlisted	WWH	PARTIAL Attainment -VG-E Fish/Fair-Poor Bugs -Fair-Poor QHEI	**Cause(s)**: Sedimentation (associated with mining, including iron hydroxide precipitates) and TDS (no	**Recreational Use** Adequate pool depth and area to support the PCR use.

Non: 0.0 miles **Length: 1.0**				direct measurements, inferred from benthic assemblage) **Source(s)**: AMD and Removal of Riparian Vegetation **Note**: Associated WQ data not available from SEDO	**Anti-Degregadation** **E and T species** none **Declining Species** none **Vunerability** Low **BioNarrative** V.Good/Poor **QHEI** >80 (0) 80-70 (0) ≤70 (100%) **Multiple Attributes** Low ***Recommended Tier*:** GHQW
Comments: Aquatic communities of Sulfur Run were sampled at two stations (RMs 0.1 and 0.8), bracketing a known mine seep. Aquatic life use impairment was indicated by the performance of the benthic macroinvertebrate community alone, as Sulfur Run was found to consistently support an assemblage of fish fully consistent with the recommended WWH designation. The macroinvertebrate community of Sulfur Run was negatively affected by past mining activities in the watershed. Orange flocculent precipitate coated the stream bottom. A limited assemblage totaling eleven taxa was collected from RM 0.8. Surprisingly, the sampling yielded stoneflies of the genus *Leuctra.* The stream water may have had some level of pH buffering; however, the large volume of smothering precipitate was having an obvious impact on the macroinvertebrate fauna. The macroinvertebrate community was in significantly worse condition at RM 0.1, indicating an additional AMD contribution from the mine portal. Only three taxa were collected including a single EPT taxa. Macroinvertebrate community condition was rated fair at RM 0.8 and poor at RM 0.1.					
Marietta Run (01-150)	**Aquatic Life Use**		**Indicators**	**Leading Causes/Sources of Aquatic Life use Impairment**	**Other Beneficial Uses/Tiers**
	Existing	**Rec.**			
Attainment **Full:** 4.0 miles **Partial:** 0.0 miles **Non:** 0.0 miles **Length: 4.0**	WWH+	WWH	FULL Attainment	NA	**Recreational Use** Adequate pool depth and area to support the PCR use. **Anti-Degregadation** **E and T species** none **Declining Species** L.Br.Lamprey (12) S.R.B Dace (106) Redside Dace (22) **Vunerability** Moderate **BioNarrative** Fair/Good **QHEI** >80 (0) 80-70 (0) ≤70 (100%) **Sensitive Species** 7 Species

					64/0.3km (5%) **Multiple Attributes** Low ***Existing Tier*:** SHQW (Entire length)
Comments: Based upon the existing WWH use, Marietta Run was found to contain fish and benthic macroinvertebrate communities consistent with applicable biocriteria.					
Big Run (01-130)	**Aquatic Life Use**		**Indicators**	**Leading Causes/Sources of Aquatic Life use Impairment**	**Other Beneficial Uses/Tiers**
	Existing	**Rec.**			
Attainment **Full:** 2.4 miles **Partial:** 1.6 miles **Non:** 0.0 miles **Length: 4.0**	EWH+	WWH	FULL Attainment **Headwater to RM1.6** PARTIAL Attainment **RM 1.6 to mouth** **-**WWH Fish/Fair Bugs - WWH QHEI (59.0) - DO (4.0-10.9, 8.2) - Nutrients (<background) - NH_3-N (=background) - BOD (=background) - pH (7.5-7.7, mean 7.6) - TDS (<background) - Sulfate (<background) - Mn (~elevated) - Al (=background) - Condct (<background) - F.coliform (1 PCR exeedence)	**Cause(s):** Low DO, Flow Alteration (low flow), and Sedimentation (sand) **Source(s):** Natural (low flow, Removal of Riparian Vegetation	**Recreational Use** Adequate pool depth and area to support the PCR use. **Anti-Degregadation** **E and T species** none **Declining Species** L.Br.Lamprey (11) Redside Dace (4) S.R.B.Dace (73) **Vunerability** High **BioNarrative** V.Good/Fair **QHEI** >80 (0) 80-70 (50%) ≤70 (50%)\ **Sensitive Species** 6 Species 49/0.3km (4.3%) **Multiple Attributes** Modest **Existing *Tier*:** SHQW (Entire length)
Comments: Based upon suspected AMD impacts, Big Run was originally designated Limited Warmwater Habitat (LWH), as part of the 1978 WQS. As this use designation has been abandoned, streams so designated must be reassessed and categorized into one of the contemporary Aquatic Life Uses. In 1995, ad hoc fish sampling was performed by Ohio EPA, SEDO. Despite the lack of other supporting data, principally the macro-benthos, it was decided then to proceed with a use recommendation of EWH, based solely on exceptional-very good performance of the fish assemblage. The 2004 intensive survey marked the first major field effort by Ohio EPA in the Federal Creek watershed. Samples collected from Big Run, at sites consistent with the previous effort, included both organism groups (fish and benthic invertebrates) as well as the collection of other supporting environmental information. The results revealed a level of overall community performance well-below the EWH biocriteria. This was primarily manifest in aquatic invertebrate community, as the fish assemblage remained comparable to the 1995 results. Based upon these and other environmental measures, the EWH use does not appear to either reflect existing conditions or reasonable potential. In light of the complete data sets					

generated in 2004, the WWH use is recommended to replace the existing EWH use for the entire length of Big Run.

Compared against the recommended WWH criteria, aquatic use impairment was limited to the lower 1.6 miles, and indicated by the macro-benthos, alone. Multiple stressors combined to render the lower segment of Big Run impaired: low dry weather flow, sand bedload, and channelization. The upper reach of Big Run was found to support a community of aquatic organisms fully consistent with the WWH biocriteria.

Sharps Run (01-110)	**Aquatic Life Use**		**Indicators**	**Leading Causes/Sources of Aquatic Life use Impairment**	**Other Beneficial Uses/Tiers**
	Existing	**Rec.**			
Attainment **Full:** 1.0 miles **Partial:** 0.0 miles **Non:** 0.0 miles **Length: 1.0**	EWH[0]	WWH	FULL Attainment	NA	**Recreational Use** Adequate pool depth and area to support the PCR use. **Anti-Degregadation** **E and T species** none **Declining Species** L.Br.Lamprey (1) S.R.B.Dace (512) **Vunerability** High **BioNarrative** Good/V.Good **QHEI** >80 (0) 80-70 (0) ≤70 (100%) **Sensitive Species** 8 Species 615/0.3km (36.9%) **Multiple Attributes** Moderate ***Recommended Tier*:** SHQW (Entire length)

Comments: Based upon suspected AMD impacts, Sharps Run was originally designated Limited Warmwater Habitat (LWH), as part of the 1978 WQS. As this use designation has been abandoned, streams so designated must be reassessed and categorized into one of the contemporary Aquatic Life Uses.

In 1995, credible fish community data (collected by Ohio University) from Sharps Fork were made available to Ohio EPA. Despite fish community performance demonstrably below the EWH criterion, and the absence of other supporting environmental data, principally the macro-benthos, it was decided then to proceed with a use recommendation of EWH. The 2004 intensive survey marked the first major field effort by Ohio EPA in the Federal Creek watershed. Sharps Fork was sampled near its mouth (RM 0.1) and the evaluation included organism groups (fish and benthic invertebrates) as well as the collection and appraisal of other supporting environmental information. The results revealed a level of community performance and habitat quality, well-below both the EWH biocriteria and EWH associated threshold, respectively.

In light of the complete data sets generated in 2004, and the fact the 1995 fish results alone never demonstrated an exceptional level of performance, the WWH use is recommended to replace the existing EWH use for the entire length of Sharps Fork. Compared against the recommended WWH criteria, Sharps Fork was found to contain a fish and benthic macroinvertebrate community fully consistent with the applicable biocriteria.

Lower Hocking River HUC: 0503020-100					
Hocking River (01-001)	**Aquatic Life Use**		**Indicators**	**Leading Causes/Sources of Aquatic Life use Impairment**	**Other Beneficial Uses/Tiers**
	Existing	**Rec.**			
RM 32.0-0.0 **Attainment** **Full:** 32.0 miles **Partial:** 0.0 miles **Non:** 0.0 miles **Length: 32.0**	WWH+	WWH	FULL Attainment	NA	**Recreational Use** PCR **Anti-Degregadation** **E and T species** none **Declining Species** Sand Darter (4) River Darter (1) Mimic Shiner (13)* **Vunerability** Moderate **BioNarrative** V.Good **QHEI** >80 (25%) 80-70 (50%) ≤70 (25%) **Sensitive Species** 19 Species 55/km (7%) **Multiple Attributes** Moderate ***Recommended Tier*:** SHQW (RM33.1-0.0) *Includes channel and mimic shiner.
Comments: Reach evaluated found to contain fish and benthic macroinvertebrate communities consistent with applicable biocriteria. Lowest mainstem station (RM 5.4) was located within Ohio River backwater, as such biocriteria not applicable.					
Strouds Run (01-023)	**Aquatic Life Use**		**Indicators**	**Leading Causes/Sources of Aquatic Life use Impairment**	**Other Beneficial Uses/Tiers**
	Existing	**Rec.**			
Attainment **Full:** 0.0 miles **Partial:** 0.0 miles **Non:** 1.0 miles **Length: 1.0**	EWH*	WWH	NON Attainment -Fair Fish/Poor Bugs -Good QHEI (68.0) -DO (6.6-7.9, mean 7.4) -Nutrients (~background) -NH_3-N (~elevated) -BOD (~background) -pH(=background) -TDS (<background) -Sulfate (<background) -Mn (elevated) -Al (~background) -Condct. (background) -F.coliform (<background)	**Cause(s):**Flow Alterations and Nutrient Enrichment (phytoplankton) **Source(s):** Upstream Impoundment (Dow Lake)	**Recreational Use** Adequate pool depth and area to support the PCR use. **Anti-Degregadation** **E and T species** none **Declining Species** none **Vunerability** Low **BioNarrative** Fair/Poor **QHEI**

					>80 (0) 80-70 (0) ≤70 (100%) **Multiple Attributes** Low ***Recommended Tier*:** GHQW

Comments: Strouds Run was originally designated EWH as part of the 1978 WQS, due to an impounded segment that forms Dow Lake reservoir, a publicly owned lake. The initial designation was applied to free flowing segments and the lake itself, and was not derived from the results of an intensive biosurvey. The 2004 Hocking River basin survey represented the first data driven evaluation of Strouds Run (and many other lower Hocking River tributaries). Field data collected as part of this effort, and their resulting interpretation, supersedes the original unverified classification. The results from said 2004 survey found that Strouds Run did not demonstrate or possess reasonable potential to support and exceptional assemblage of aquatic organisms. Therefore the WWH aquatic life use is recommended for the free flowing segments of Strouds Run. The pool formed by the Dow Lake dam, is recommended to retain the EWH designation.

Based upon the recommended WWH aquatic life, the segment of Strouds Run downstream from the Dow Lake Dam was found impaired. Narratively, the community ranged between fair and poor, and appeared, as commonly observed, impacted by modifications associated with Dow Lake: hydrologic disruption, export of plankton, and possibly thermal disruption.

Willow Creek (01-020)	**Aquatic Life Use**		**Indicators**	**Leading Causes/Sources of Aquatic Life use Impairment**	**Other Beneficial Uses/Tiers**
	Existing	**Rec.**			
Attainment **Full:** 2.8 miles **Partial:** 0.2 miles **Non:** 0.0 miles **Length: 3.0**	WWH*	WWH	FULL Attainment **Headwaters to RM 0.2** PARTIAL Attainment **RM 0.2 to mouth** -MG Fish/Fair Bugs -WWH QHEI (67.0) -DO (4.0=8.5, mean 7.5) -Nutrients (=background) -NH_3-N (=background) -BOD (=background) -pH (=background) -TDS (=background) -Sulfate (<background) -Mn (=background -Al (~background) -Condct. (=background) -F.coliform (background)	**Cause(s):** Flow Alteration **Source(s)**:Natural (low flow, possibly a losing stream near mouth)	**Recreational Use** Adequate pool depth and area to support the PCR use. **Anti-Degregadation** **E and T species** none **Declining Species** L.Br.Lamprey (23) S.R.B.Dace (4) **Vunerability** Moderate **BioNarrative** M.Good **QHEI** >80 (0) 80-70 (33.4%) ≤70 (66.6%) **Sensitive Species** 4 Species 18/0.3km (2.1%) **Multiple Attributes** Low ***Recommended Tier*:** GHQW

Comments: Aquatic life use impairment of Willow Creek was delineated by the macro-benthos alone, and limited to the lower 0.2 miles. The stream is subject to sedimentation and minimal sustained dry weather flow. Little if any flow was observed when qualitative sampling was conducted. Willow Creek at RMs 2.6 and 1.4 produced assemblages that marginally met ecoregional expectations. Willow Creek at RM 0.1 supported the lowest quality macroinvertebrate assemblage due largely to interstitial flow which limited both EPT taxa and sensitive taxa collected (5 each). Macroinvertebrate community condition was rated fair.					
Scott Creek (01-072)	**Aquatic Life Use**		**Indicators**	**Leading Causes/Sources of Aquatic Life use Impairment**	**Other Beneficial Uses/Tiers**
	Existing	**Rec.**			
Attainment **Full:** 1.0 miles **Partial:** 0.0 miles **Non:** 0.0 miles **Length: 1.0**	Unlisted	WWH	FULL Attainment	NA	**Recreational Use** Adequate pool depth and area to support the PCR use. **Anti-Degregadation** **E and T species** none **Declining Species** none **Vunerability** High **BioNarrative** M.Good/V.Good **QHEI** >80 (0) 80-70 (100%) ≤70 (0) **Multiple Attributes** Low ***Recommended Tier*:** GHQW
Comments: Reach evaluated found to contain fish and benthic macroinvertebrate communities consistent with applicable biocriteria.					
Jordan Run (01-006)	**Aquatic Life Use**		**Indicators**	**Leading Causes/Sources of Aquatic Life use Impairment**	**Other Beneficial Uses/Tiers**
	Existing	**Rec.**			
Attainment **Full:** 3.0 miles **Partial:** 0.0 miles **Non:** 0.0 miles **Length: 3.0**	EWH+	WWH	FULL Attainment	NA	**Recreational Use** Adequate pool depth and area to support the PCR use. **Anti-Degregadation** **E and T species** none **Declining Species** S.R.B.Dace (173) **Vunerability** High **BioNarrative** V.Good/Good

					QHEI >80 (0) 80-70 (0) ≤70 (100%) **Sensitive Species** 4 Species 17/0.3km (1.5%) **Multiple Attributes** Low ***Recommended Tier*:** GHQW
Comments: Jordan Run was originally designated Warmwater Habitat (WWH), as part of the 1978 WQS. This unverified use persisted until Ohio EPA SEDO initiated an ad hoc fish sampling effort on Jordan Run in 1995. Despite both the lack of supporting data, principally the macro-benthos, and sample coverage limited to one station (RM 1.1), it was decided then to proceed with a use recommendation of EWH, based solely on exceptional performance of the fish assemblage. The 2004 Hocking River survey marked the first major field effort by Ohio EPA in the lower Hocking River basin. Jordan Run was evaluated at two sites and included the collection of a full suite of environmental indicators. The results revealed a level of overall community performance below the EWH biocriteria. This was primarily manifest in aquatic invertebrate community, as the fish assemblage remained comparable with the 1995 results. Based upon these and other environmental measures, the EWH use does not appear to either reflect existing conditions or reasonable potential. In light of the complete data sets generated in 2004, the WWH use is recommended to replace the existing EWH use for the entire length of Jordan Run. Compared against the recommended WWH criteria, Jordan Run was found to support a community of aquatic organisms fully consistent with the WWH biocriteria.					
Frost Run (01-005)	**Aquatic Life Use**		**Indicators**	**Leading Causes/Sources of Aquatic Life use Impairment**	**Other Beneficial Uses/Tiers**
	Existing	**Rec.**			
Attainment **Full:** 0.0 miles **Partial:** 1.0 miles **Non:** 0.0 miles **Length: 1.0**	WWH*	WWH	PARTIAL Attainment -MG Fish/Fair Bugs -WWH QHEI (59.5) -DO (3-8.2, mean 5.6) -Nutrients (<background) -NH_3-N (elevated) -BOD (=background) -pH (=background) -TDS (<background) -Sulfate (<background) -Mn (<below Background) -Al (<background) -Condct. (~background) -F.coliform (<background)	**Cause(s):**Low DO, Flow Alteration, and Sedimentation (sand, shifting and unstable) **Source(s):** Natural (low flow, possibly a losing stream near mouth)	**Recreational Use** Adequate pool depth and area to support the PCR use. **Anti-Degregadation** **E and T species** none **Declining Species** none **Vunerability** Low **BioNarrative** M.Good/Fair **QHEI** >80 (0) 80-70 (0) ≤70 (100%) **Multiple Attributes** Low ***Recommended Tier*:** GHQW
Comments: Aquatic life use impairment of Frost Run was delineated by the macro-benthos alone. Sand was the					

only substrate available at RM 0.5 on Frost Run and no flow was observed when qualitative sampling was conducted. The macroinvertebrate community reflected these conditions in the absence of filter feeding taxa such as Hydropsychid caddisflies. The collected organisms were indicative of acceptable water quality and the community reflected a fair condition largely due to interstitial flow.					
Skunk Run (01-004)	**Aquatic Life Use**		**Indicators**	**Leading Causes/Sources of Aquatic Life use Impairment**	**Other Beneficial Uses/Tiers**
	Existing	**Rec.**			
Attainment **Full:** 2.0 miles **Partial:** 0.0 miles **Non:** 0.0 miles **Length: 2.0**	WWH*	WWH	FULL Attainment	NA	**Recreational Use** Adequate pool depth and area to support the PCR use. **Anti-Degregadation** **E and T species** none **Declining Species** L.Br.Lamprey (1) **Vunerability** High **BioNarrative** Good **QHEI** >80 (0) 80-70 (0) ≤70 (100%) **Multiple Attributes** Low ***Recommended Tier*:** GHQW
Comments: Reach evaluated found to contain fish and benthic macroinvertebrate communities consistent with applicable biocriteria.					
Fourmile Cr. (01-010)	**Aquatic Life Use**		**Indicators**	**Leading Causes/Sources of Aquatic Life use Impairment**	**Other Beneficial Uses/Tiers**
	Existing	**Rec.**			
Attainment **Full:** 3.0 miles **Partial:** 0.0 miles **Non:** 0.0 miles **Length: 3.0**	EWH*	WWH	FULL Attainment	NA	**Recreational Use** Adequate pool depth and area to support the PCR use. **Anti-Degregadation** **E and T species** none **Declining Species** L.Br.Lamprey (2) S.R.B.Dace (14) **Vunerability** High **BioNarrative** V.Good/Good **QHEI** >80 (0) 80-70 (0) ≤70 (100%)

					Sensitive Species 4 Species 122/0.3km (7%) **Multiple Attributes** Moderate ***Recommended Tier*:** GHQW
Comments: Fourmile Creek was originally designated EWH as part of the 1978 WQS. As this initial designation was, by definition, unverified, actual field data collected as part of the 2004 Hocking River basin and their resulting interpretation, supersedes the original classification. The results from said 2004 survey found that Fourmile Creek did not demonstrate or possess reasonable potential to support and exceptional assemblage of aquatic organisms. Therefore the WWH aquatic life use is recommended for the entire length of Fourmile Creek. Based upon the recommended WWH aquatic life use, the reach evaluated was found to contain fish and benthic macroinvertebrate communities consistent with applicable biocriteria.					
E.Fourmile Cr. (01-011)	**Aquatic Life Use**		**Indicators**	**Leading Causes/Sources of Aquatic Life use Impairment**	**Other Beneficial Uses/Tiers**
	Existing	**Rec.**			
Attainment **Full:** 2.0 miles **Partial:** 0.0 miles **Non:** 0.0 miles **Length: 2.0**	EWH*	WWH	FULL Attainment	NA	**<u>Recreational Use</u>** Adequate pool depth and area to support the PCR use. **<u>Anti-Degregadation</u>** **E and T species** none **Declining Species** none **Vunerability** Low **BioNarrative** V.Good/Poor **QHEI** >80 (0) 80-70 (0) ≤70 (100%) **Multiple Attributes** Low ***Recommended Tier*:** GHQW
Comments: East Fourmile Creek was originally designated EWH as part of the 1978 WQS. As this initial designation was, by definition, unverified, actual field data collected as part of the 2004 Hocking River basin and their resulting interpretation, supersedes the original classification. The results from said 2004 survey found that East Fourmile Creek did not demonstrate or possess reasonable potential to support and exceptional assemblage of aquatic organisms. Therefore the WWH aquatic life use is recommended for the entire length of East Fourmile Creek. Based upon the recommended WWH aquatic life use, the reach evaluated found to contain fish and benthic macroinvertebrate communities consistent with applicable biocriteria.					