Whisky Run Subwatershed Assessment

The discharges that impact Whisky Run have widely varying chemistries, ranging from highly acidic discharges with high concentrations of both iron and aluminum to discharges with circum-neutral pH and net-alkaline chemistry. However, most of the discharges are not unlike many of the other discharges in the Blacklegs Creek watershed in that they typically have low iron concentrations, moderate to high aluminum concentrations, and average pH in the range of 3 to 4.

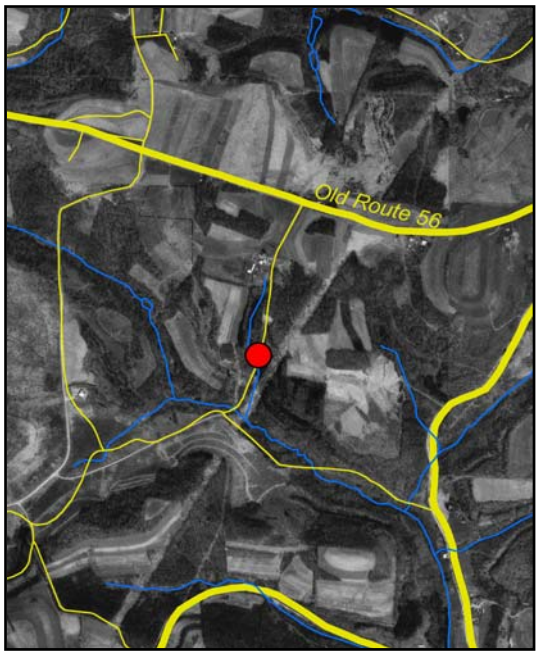
Eleven discharges have been identified and sampled within the Whisky Run subwatershed. Sufficient data have been collected to formulate conceptual passive treatment design strategies for 10 of these 11 sites. WR10 has been sampled twice with radically different results. General design strategies were identified for WR10, and were individually based on each sample result. A description of discharges and conceptual treatment strategies follows.

WR1

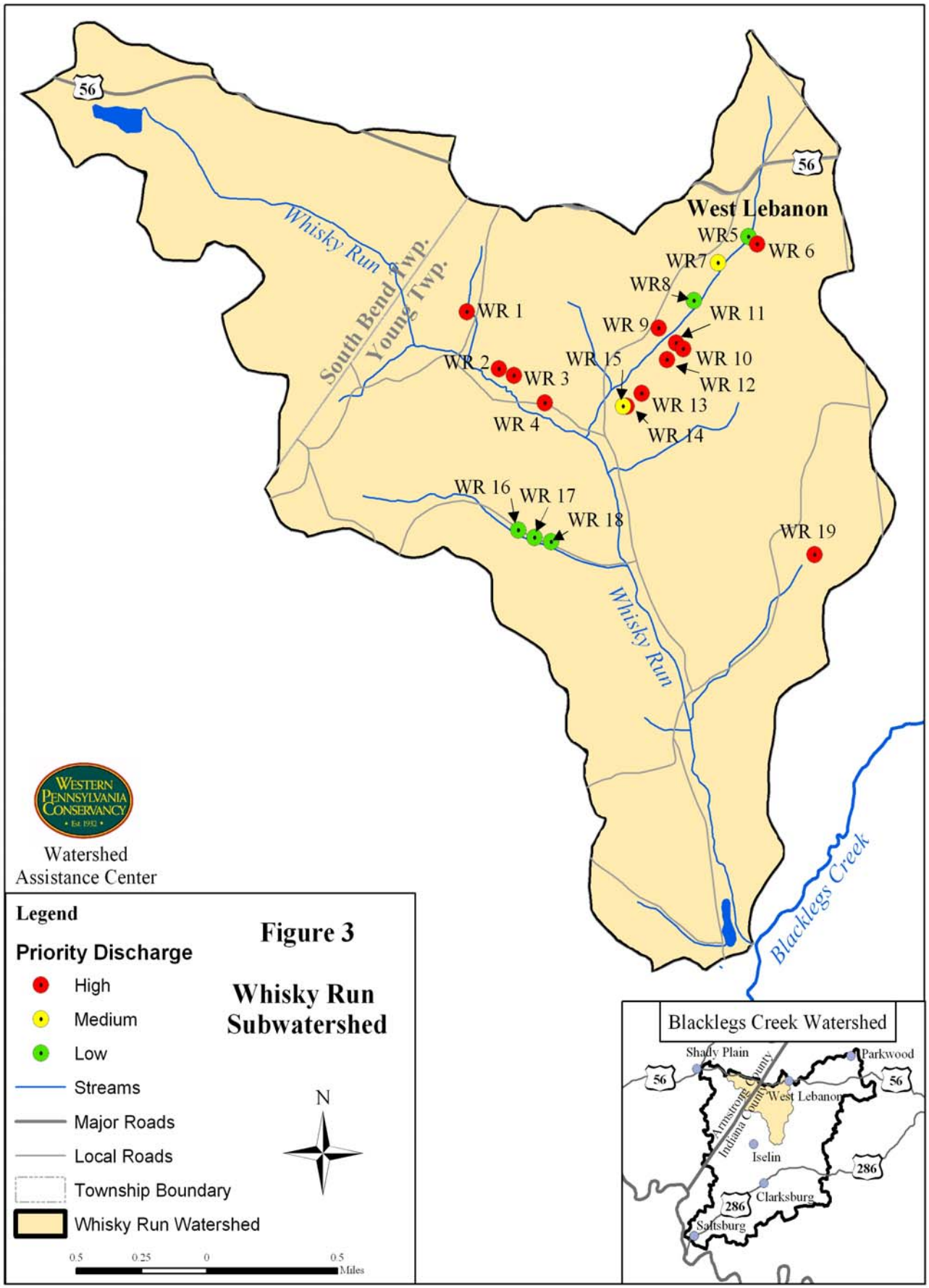
Two moderate flows join to form this discharge. Both flows appear to originate from the same mine complex, with an estimated flow of greater than 50 gpm. No iron staining is present at the site, but metals are uncertain due to low pH (3.1-3.5) tested at various points along the discharge. The discharge flows under the road and through a large wetland complex. These wetlands seem to do little to treat the discharge and will inhibit the construction of a treatment system.

Photo of WR1

WR 1 (Avonmore and McIntyre DRG)



WR1 (Avonmore NE and McIntyre)


56
West Lebanon
WR5
WR 6
WR7
WR8
WR 1
WR 9
WR 11
WR 2
WR 3
WR 15
WR 10
WR 12
WR 4
WR 13
WR 14
WR 16
WR 17
WR 18
WR 19
Whisky Run
South Bend Twp.
Young Twp.
Whisky Run
Blacklegs Creek
Western Pennsylvania Conservancy
Est. 1932
Watershed Assistance Center
Legend
Priority Discharge
High
Medium
Low
Streams
Major Roads
Local Roads
Township Boundary
Whisky Run Watershed
0.5 0.25 0 0.5 Miles
Figure 3
Whisky Run Subwatershed
N
Blacklegs Creek Watershed
Shady Plain
Parkwood
56
56
Armstrong County
Indiana County
West Lebanon
Iselin
286
Clarksburg
286
Saltsburg

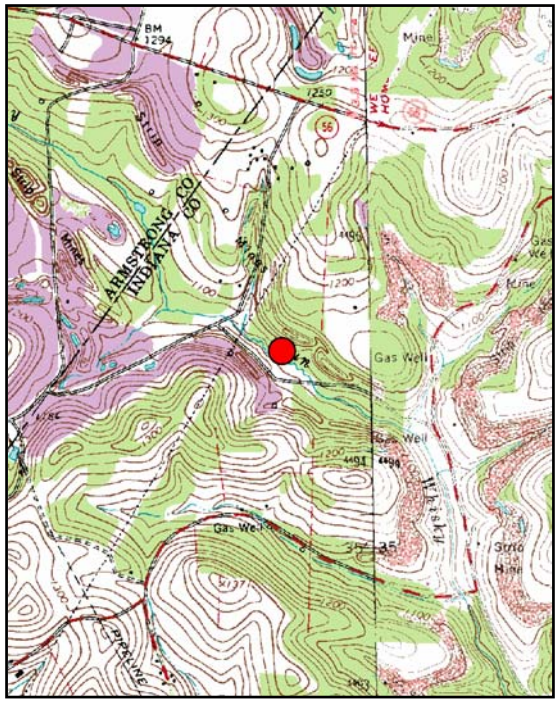
The moderate iron concentrations in this discharge indicate the potential need to incorporate measures to prevent the armoring of the limestone with iron precipitates. For this reason, it is believed that a vertical flow wetland may be appropriate for this purpose. In addition, the high concentrations of aluminum dictate that a system for flushing aluminum precipitates from the limestone bed will be an integral part of the system. Based on the water chemistry, this discharge is a good candidate for passive treatment. However, before an appropriate system can be sized and designed for this system, it is recommended to collect flow data on a monthly basis for one year. If insufficient space exists for a vertical flow wetland, an upflow limestone may also be an option to treat this discharge.

Table 10. Discharge WR1 Chemistry	
Parameter	**Average (n=8)**
Flow	Unknown
pH	3.4
Calculated Acidity	125.8 mg/L
Alkalinity	0
Iron	2.7 mg/L
Aluminum	15.2 mg/L
Manganese	8.5 mg/L

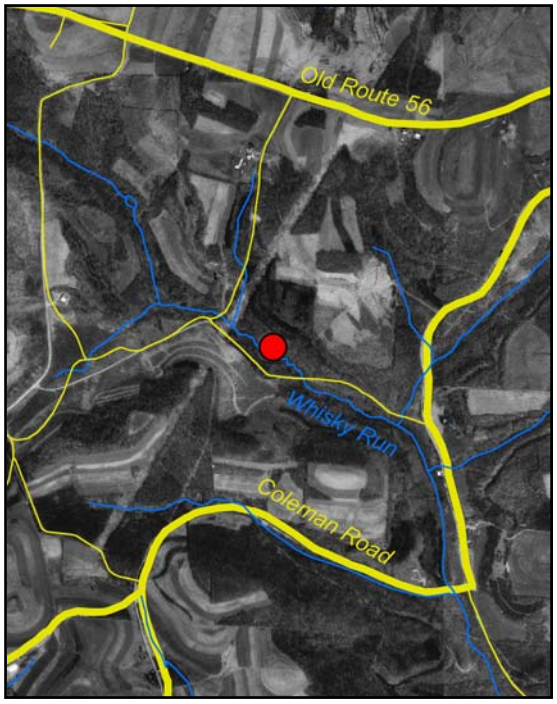
WR2

This discharge comes from a mine opening off of Pony Road and seeps down a hillside until it enters a long wetland complex. It is adjacent to discharge WR3. A sample station has been established where a weir is already present.

Photo of WR2



WR2 (Avonmore DRG)



WR2 (Avonmore SE and NE)

Conceptual Treatment Consideration

The low concentrations of iron in this discharge reduce the need for a vertical flow wetland type system. In this case, it is believed that a limestone pond is appropriate for passive treatment. In addition, the high concentrations of aluminum indicate that a system for flushing aluminum precipitates from the limestone bed will be required. Based on the water chemistry, this discharge is a good candidate for passive treatment. However, before an appropriate system can be sized and designed for this system, it is recommended that flow data should be collected on a monthly basis for one year. Due to its proximity to WR3, it may be possible to treat both of these discharges at a single location with a single treatment system. This approach would have several advantages, including a smaller footprint and simplified monitoring and maintenance requirements.

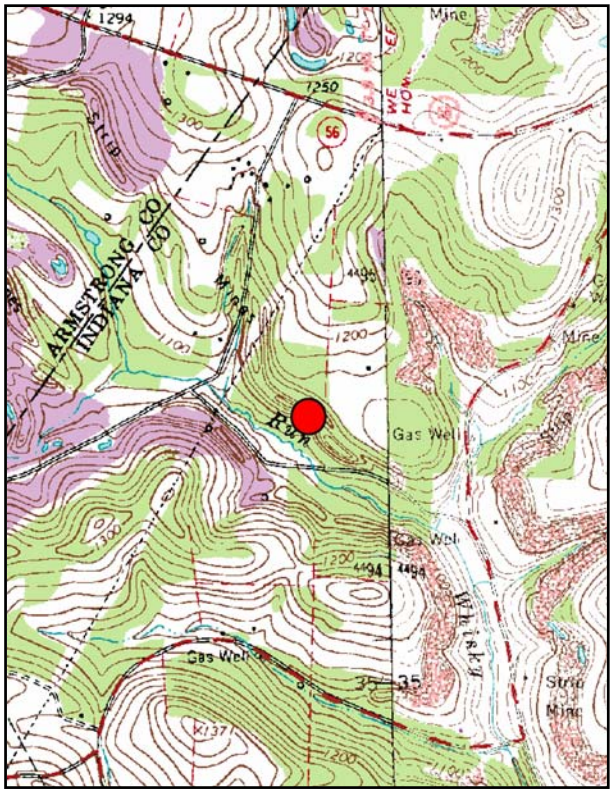
Table 11. Discharge WR2 Chemistry

Parameter	Average (n=9)
Flow	Unknown
pH	3.4
Calculated Acidity	117.2 mg/L
Alkalinity	0
Iron	1.0 mg/L
Aluminum	12.1 mg/L
Manganese	15.3 mg/L

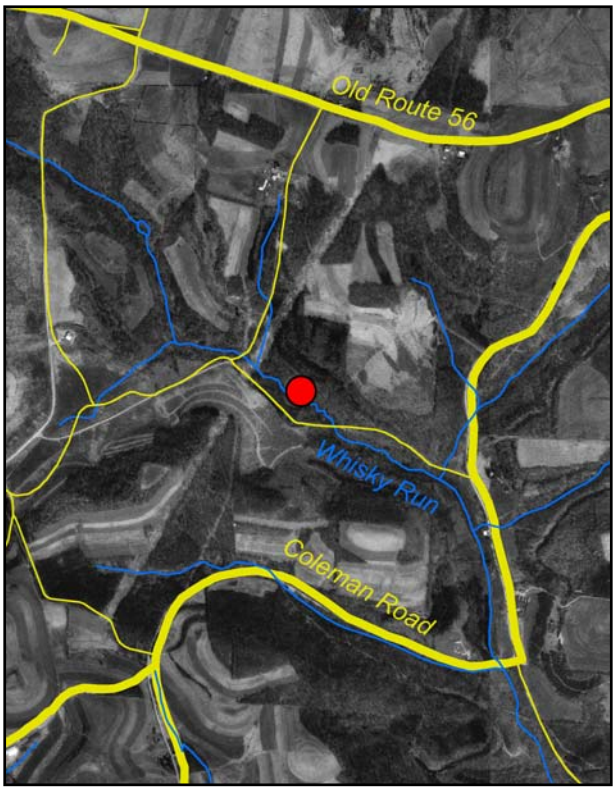
WR3

This major discharge emanates from an abandoned deep mine opening. Flow is estimated at 75-100 gpm. The discharge is adjacent to WR2. Treatment area is limited due to this AMD flowing into a very large wetland complex. There is a small AMD seep next to the discharge originating from the same mine pool.

Photo of WR3



WR 3 (Avonmore DRG)



WR 3 (Avonmore NE and McIntyre NW)

Conceptual Treatment Consideration

The type of passive treatment system recommended for this discharge is a limestone pond. Moderate concentrations of aluminum are present and must be flushed from the passive treatment system to ensure longevity. Based on the water chemistry, this discharge is a good candidate for passive treatment. However, before an appropriate system can be sized and designed for this system, it is recommended to collect flow data on a monthly basis for one year.

Due to its proximity to WR2, it may be possible to treat both of these discharges at a single location with a single treatment system. This approach would have several advantages, including a smaller footprint and simplified monitoring and maintenance requirements.

Table 12. Discharge WR3 Chemistry	
Parameter	**Average (n=9)**
Flow	18.6 gpm (n=7)
PH	3.5
Calculated Acidity	72.9 mg/L
Alkalinity	0
Iron	1.1 mg/L
Aluminum	4.7 mg/L
Manganese	15.7 mg/L

WR4

This AMD is located adjacent to a large wetland complex and enters a tributary of Whisky Run downstream of WR2 and WR3. The seep is located adjacent to and travels along Pony Road before entering the tributary. A weir is present on the site. This site is a low priority due to its low flow and minimal impact to Whisky Run.

Photo of WR 4

WR5

This discharge originates as a seep with a pH of 4.7. A mining company is currently treating this discharge with a limestone treatment system. There is some iron staining of the limestone. The pH of the effluent from the treatment system is ~6.6. The discharge is being released through an elbow pipe facing upwards, which provides aeration. This discharge is a low priority because it is already being treated successfully.

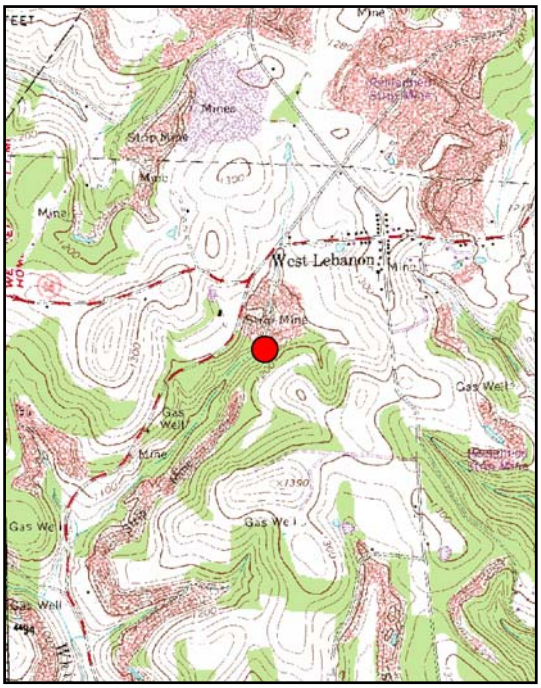
Photo of WR5 Discharge

Photo of WR5 Treatment System

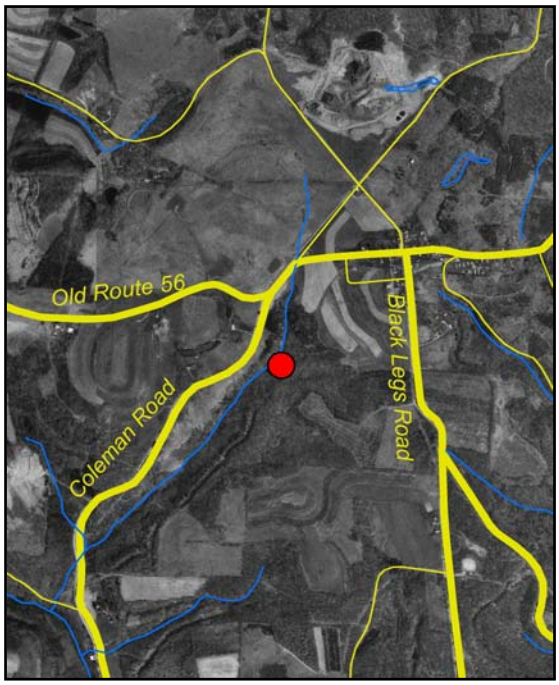
WR6

This discharge of moderate flow emanates from an abandoned mine opening. Estimated flow is less than 10 gpm. The pH of the discharge is approximately 3.3. The discharge flows 150 feet to the stream through what appears to be a constructed channel. The flow has caused a large wetland area to develop, limiting treatment options. The mainstem of the stream is showing significant metal deposits, mainly aluminum.

Photo of WR6



Avonmore and McIntyre DRG (1:24,000)



Avonmore and McIntyre NW DOQQ (1:24,000)

Table 13. Discharge WR6 Chemistry	
Parameter	**Average (n=4)**
Flow	Unknown
pH	3.5
Calculated Acidity	164.7 mg/L
Alkalinity*	0
Iron	31.7 mg/L
Aluminum	6.6 mg/L
Manganese	22.8 mg/L

Conceptual Treatment Consideration

The high iron concentrations in this discharge dictate the need to incorporate measures to prevent the armoring of the limestone with iron precipitates. In this case, it is believed that a vertical flow wetland is an appropriate choice for passive treatment. Complicating the treatment system design are moderate concentrations of aluminum. Therefore, a system for flushing aluminum precipitates from the limestone bed will also be required. Based on the water chemistry, this discharge is a good candidate for passive treatment. However, the space limitations in designing a system may prove challenging.

WR 7

This very small seep originates from the base of a reclaimed strip mine. The pH of the discharge is 3.1 and the flow is estimated at less than 5 gpm. The discharge flows over a small tram road approximately 200 feet until it reaches the stream. There is some area available for treatment, but the site is not considered a high priority due to its minimal impact on the receiving stream.

Photo of WR7

Photo of WR8

WR8

This small seep originates at the base of a reclaimed strip mine, with the discharge seeping out at various points along the hillside next to an adjacent gas well. The pH of the discharge is ~6.1, but there is a significant amount of iron present. Flow is less than 1 gpm. Due to the low flow, this is not a priority site.