YELLOW CREEK SUMMARY

Biological sampling using fish and macroinvertebrates was conducted at 78 sites from 44 streams in the Yellow Creek and Little Yellow Creek basins in 2005. The watersheds are located in northeastern Ohio and drain to the Ohio River south of East Liverpool (Figure 1). Associated chemical, sediment, bacteriological and physical habitat sampling also was conducted in the basin to support the biological evaluations. Watershed sizes at the sampling sites ranged from 1.7 mi^2 to 224 mi^2.

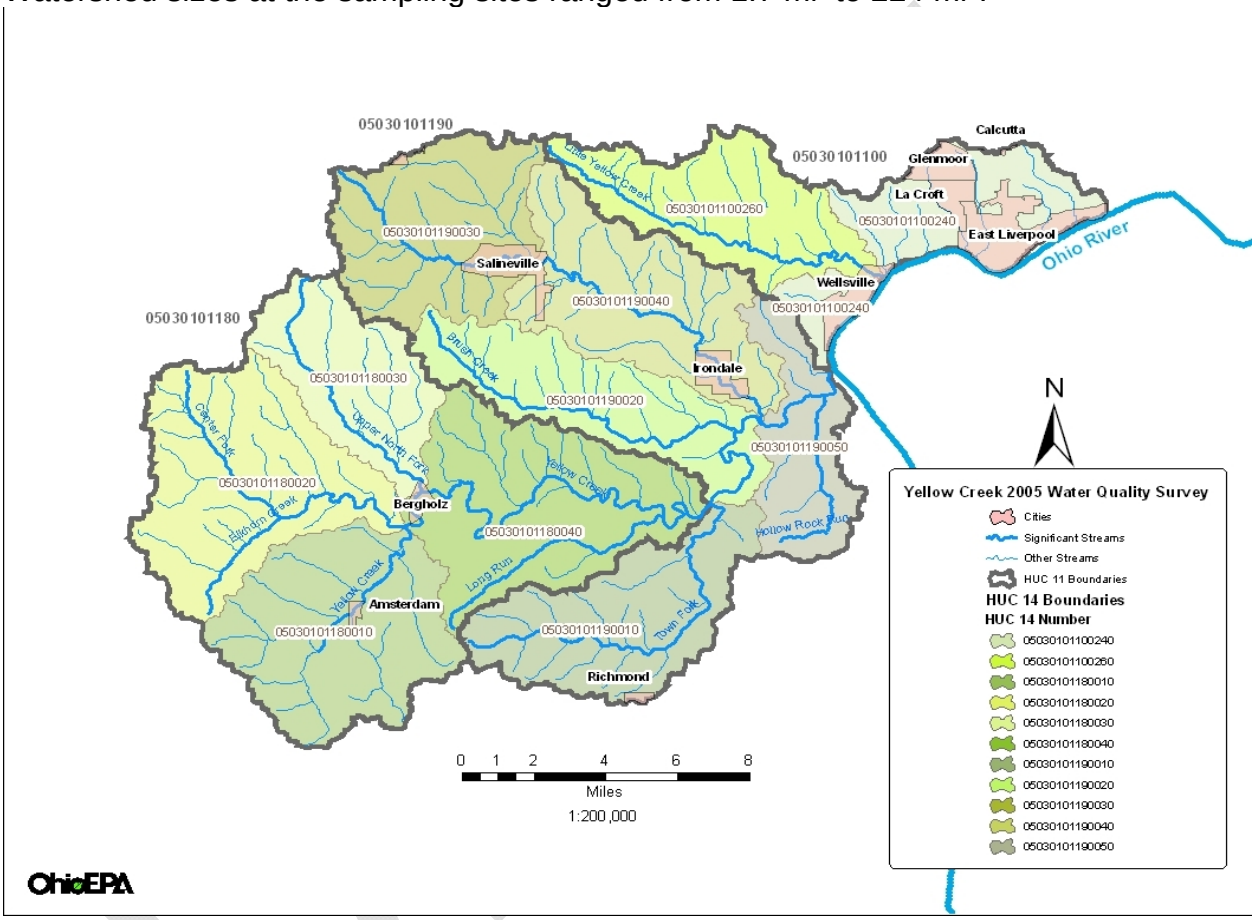

Figure 1. Watershed Assessment Units (WAUs) in the Yellow Creek and Ohio River Tribs. study area. Upper Yellow Creek, Lower Yellow Creek and Ohio River Tributaries (including Little Yellow Creek) study areas are identified by 11 digit Hydrologic Unit Code (HUC).

Major findings and conclusions of the survey include:

- The Yellow Creek watershed is largely forested, high gradient, and quite remote with low population densities and a lack of heavy industry. Stream channels throughout the basin are largely intact and lack significant alteration from channelization, straightening or impoundment. In addition, even the smallest streams sampled (1.7 sq. mi. minimum watershed size) were largely perennial

with sustained flow augmented by cool, groundwater intrusion. These factors result in remarkable stream assimilative capacity and tend to blunt the influence of local pollutant stressors.

- Biological sampling results tended to reflect these positive basin-wide attributes as community health routinely fell in the very good and exceptional ranges (Figure 2). The level of biological performance in the Yellow Creek basin (> 90 percent attainment) ranks it among the highest in the state. In addition, a majority of Yellow Creek basin sites reflected Exceptional Warmwater Habitat (EWH) potential, Coldwater Habitat (CWH) potential, or both. A map summarizing biological community health across the basin is shown in Figure 3.

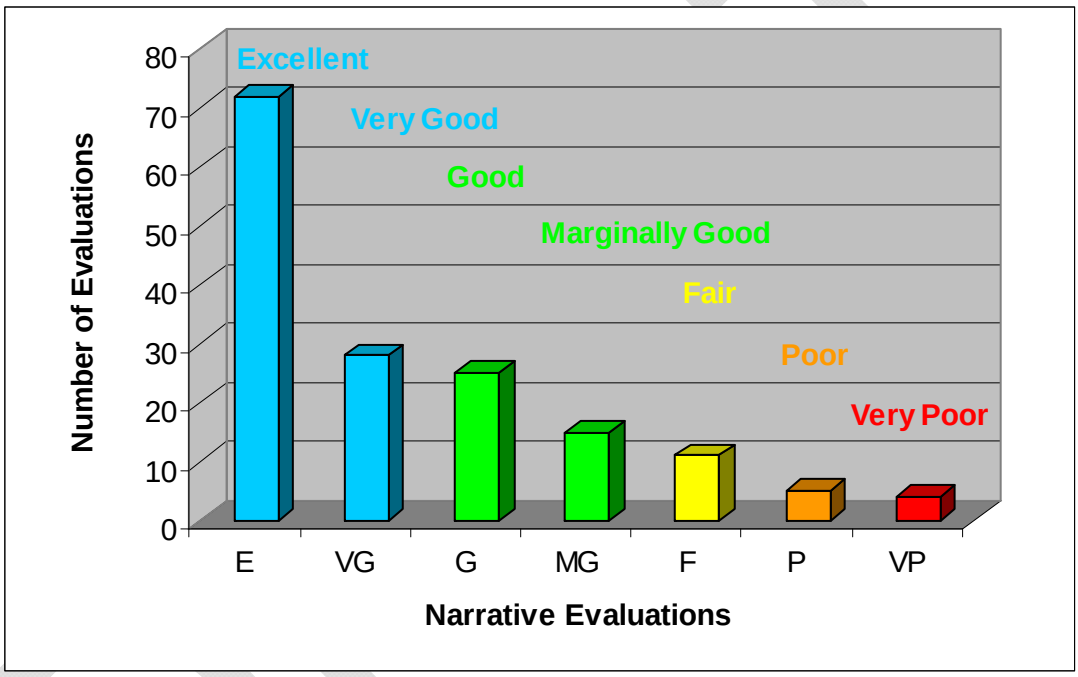

Figure 2. Narrative evaluations associated with fish and macroinvertebrate sampling sites in the Yellow Creek and Little Yellow Creek basin surveys (WAUs 100, 180, 190), 2005-2006. Evaluations were based on IBI, MIwb and ICI scores, and qualitative, natural substrate samples.

- Overall, 72 percent of sites (56) in the study area had biological communities fully meeting their designated or recommended aquatic life use while only 21 percent (16 sites) were impaired. As a result of data limitations, attainment status at the remaining 8 percent (six sites) was not determined.

- 50 percent of impaired sites were located in Watershed Assessment Unit (WAU) 100, the small, 45 square mile drainage that lies directly along the more densely populated Ohio River corridor and includes Little Yellow Creek. Only one of nine

sites (11 percent) in the watershed met the appropriate aquatic life use designation. Samples reflected more severe impairments associated with impoundment, urban runoff, highway construction and mining.

- Biological impairments in the remainder of the study area (Yellow Creek basin) were generally small or localized and typically associated with mining, septic tank drainage, and impoundment. Recreational impairment from fecal coliform bacteria was more widespread and most often associated with on-site home septic systems concentrated in small villages and rural livestock operations.

- With one exception, all mainstem Yellow Creek and North Fork Yellow Creek sites supported biological communities meeting expectations for Warmwater Habitat (WWH) or EWH. The site that did not attain, Yellow Creek river mile 3.3, was located immediately downstream from North Fork Yellow Creek. Mine drainage, primarily associated with a problematic abandoned shaft seep at the mouth of the North Fork, was the suspected source of impairment (Ohio EPA, 2003).

- A large stretch of the middle Yellow Creek mainstem, from Bergholz to Hammondsville (river miles 24.2-3.4), is recommended for an upgrade from WWH to EWH. In addition, two former Limited Resource Water (LRW) streams affected by mine drainage (Wolf Run and Salisbury Run) are now recommended for a CWH designation.

- A comparison of historical trends in upper Yellow Creek and Wolf Run since the early 1980s suggests significant recovery in chemical and biological conditions downstream from mining activity. While mining impacts remain severe in the headwaters of Wolf Run, the lower reaches have improved from nearly lifeless in 1982, to a marginally good to exceptional condition in 2005 and 2006. Substantial improvement, particularly in Yellow Creek fish communities, was also observed downstream from mining sources in the headwaters. These improvements appear largely a result of both Ohio Department of Natural Resources reclamation activity and natural recovery or attenuation (Hughes and Bowman 2007).

- Results of the 2005 survey, particularly the high level of biological performance in the Yellow Creek basin, were somewhat surprising. Both active and historic mining activity are widespread in the basin but 2005 results found most mining influences were negligible or fairly localized and restricted to small drainages (*e.g.,* Salisbury Run, Wells Run, and Wolf Run). Bacteriological contamination also was common, particularly near population centers and livestock operations in the upper Yellow Creek basin. However, biological performance in these areas was routinely very good or exceptional and often reflective of cold groundwater influences.

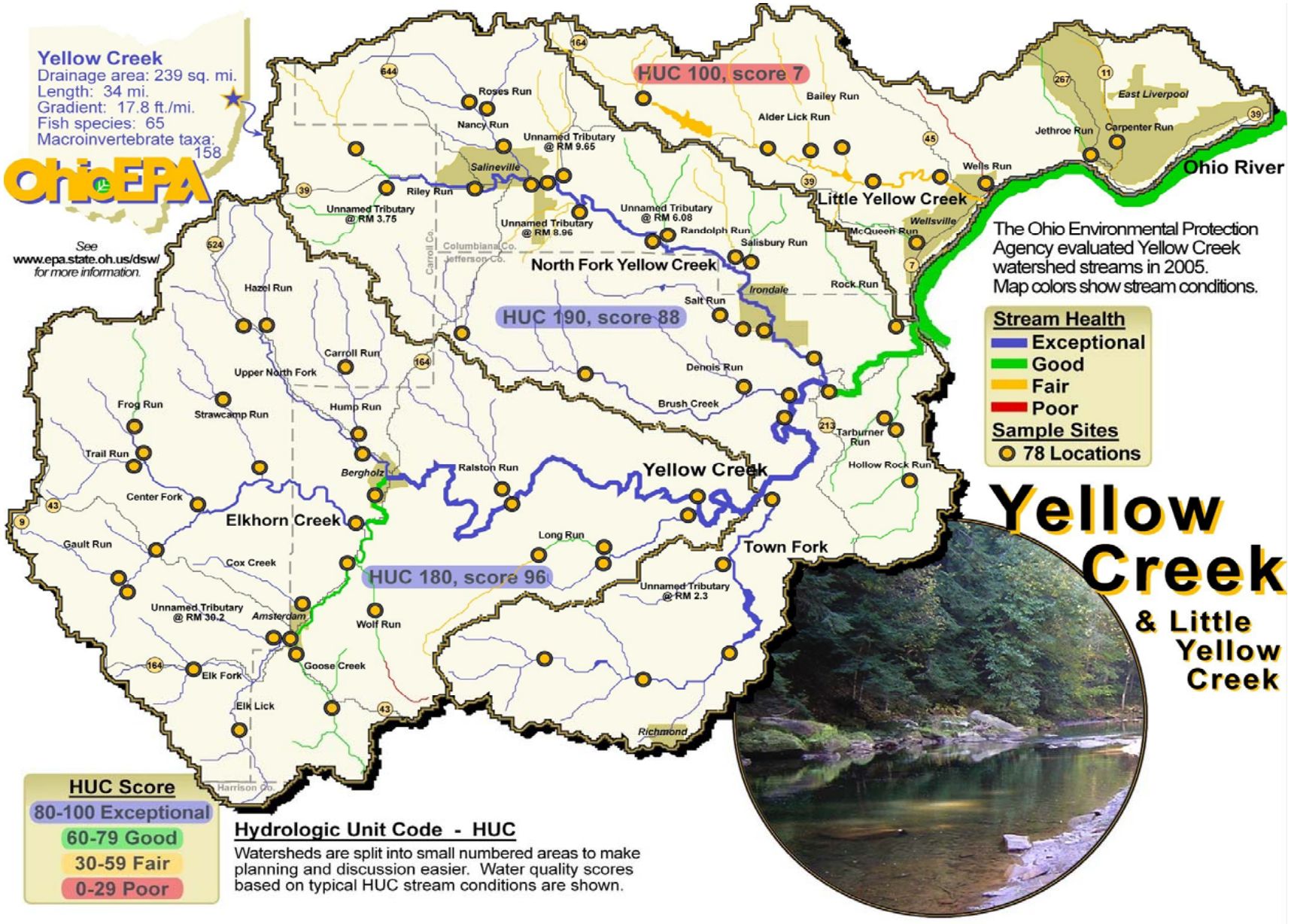

Figure 3. Biological community health (fish and macroinvertebrates) in streams sampled during the Yellow Creek watershed survey, 2005-2006.