

## 9. Conclusions

### The State of the Lower Olentangy River Watershed in 2001

Based on the information collected for this watershed inventory, the Lower Olentangy River is currently meeting the Clean Water Act goal of being “fishable and swimmable”. It is an important and critical natural resource to an increasing number of Central Ohio residents. Much of the river, especially upstream of the city of Columbus, currently is in full attainment of its use designations as: (1) a public drinking water supply; (2-3) a source of agricultural and industrial waters; (4) primary contact recreational uses, and (5) a diverse and abundant aquatic biota.

Natural stream flow in the Olentangy River and its tributary streams consists of typically low flow conditions punctuated by short-term, high-volume discharge “spikes” resulting from significant rainfall events in the watershed. The periodicity and impacts of flood events in the watershed have been exacerbated by extensive deforestation and by the development of impermeable surface areas associated with urbanization. These alternating extremes in stream flow in the Lower Olentangy River watershed have been muted by the construction of the Delaware Dam for flood-control in 1949. The dam, north of the city of Delaware, controls downstream flow in the river, leveling out this flow by blunting the effects of flood events and insuring minimum flow levels during drought periods to downstream communities who are dependent on the river for their drinking water supplies.

Major “withdrawals” from this portion of the river include the city of Delaware water plant north of the city and the DelCo Water Company water plant in Liberty Township in southern Delaware County. The city of Columbus is also now using downstream portions of the Olentangy River as a back-up water supply for its Dublin Road water plant. Downstream flow is increasingly augmented by “deposits” of treated effluent from the Delaware Wastewater Treatment Plant in Delaware and the Olentangy Environmental Control Center WWTP in southern Delaware County such that as much as two-thirds of the stream flow in the lower stretches of the river today is treated wastewater. These discharges will likely increase in the future as explosive population growth and development continues in this portion of the watershed -- the fastest growing area in the state.

Physiographically, geologically, and culturally, the Lower Olentangy River watershed can be divided into two distinct rivers. The upper “State Scenic River” portion of the river currently retains much of its original natural beauty, running in a narrow gorge incised into steep shale bedrock cliffs as it moves south across rural and low-density suburban portions of southern Delaware County. In contrast, the lower “Urban River” in Franklin County flows through a broader valley impacted by significant hydromodifications of the river and its floodplain. These include numerous low-head dams and a locally deepened and straightened channel, as well as the encroachment of dense urban development onto the river’s flood plain.

The Olentangy River and what’s left of the forested corridor through which runs still sustain relics of the incredibly diverse and abundant aquatic and terrestrial biotas characteristic of

Ohio prior to the arrival of Europeans in the area in the late 1700's. These include diverse and abundant fish populations that contain pollution-sensitive redhorse suckers, madtoms, and darters plus significant numbers of Ohio's premier gamefish, the smallmouth bass. Endangered or threatened species include the Spotted Darter, the Bluebreast Darter, the River Redhorse, and the Northern Brook Lamprey. The Lower Olentangy river also supports viable populations of in excess of 14 species of freshwater mussels, including the state endangered "Snuffbox" and "Rayed Bean", the state-threatened "Pondhorn", and the state special interest "Round Pigtoe" and "Wavy-lined Lampshell". The river corridor provides an important flyway and habitat for a diverse variety of Neotropical migratory songbirds, waterfowl, and raptors, including the endangered Bald Eagle, the Osprey, and the Yellow-crowned Night Heron. Forested riparian habitats flanking the river, even in heavily urbanized portions of Columbus, support surprising populations of white-tailed deer, beavers, muskrat, coyotes, and possibly even the state-threatened River Otter.

The Olentangy River and its watershed continue to be a focal point for the human communities that have grown-up along its course – providing critical natural resources, drinking water and game fish; and recreational opportunities, including fishing, canoeing, kayaking, and bicycling, to its residents. Rather than being a barrier physically separating these communities, the river serves as the common thread that binds these neighborhoods together. As the stresses and demands of the modern world continue to increase, the preserved natural areas along the river, especially in urban areas, provide a needed quiet respite from the noise, hustle, and bustle of the surrounding urban environments. The river and its corridor contribute significantly to the quality of life of its residents and neighbors. The economic potential of these communities is linked directly to the natural beauty, quality, health, and welfare of the river and tributary streams that make up the watershed.

## **Report Card for the River Mainstem**

The 1999 Ohio EPA biological and water quality study of the Lower Olentangy River and its tributaries provided a snapshot of the health and welfare of the river and these tributary streams at the onset of the 21<sup>st</sup> century. Based largely on the results of this study, the mainstem of the Olentangy River, from the Delaware Dam to the river's confluence, would rate a grade of B or B+.

### **What's Good About the River**

As indicated in the previous section and Tables 34 and 35, positive features of the mainstem of the river include: 1) generally good chemical water quality the length of the river studied with low ammonia and uniformly high dissolved oxygen values; 2) mostly good, natural instream habitats and variably developed wooded riparian areas, especially upstream of the OSU campus; 3) corresponding good to excellent fish biotas and mostly good bottom-dwelling invertebrate faunas, again upstream from OSU; 4) most stretches of the river were in full attainment of their aquatic use designations, at least those areas upstream from the OSU campus; and 5) a documented trend towards improving conditions on the river mainstem since the late 1980's when surveys of water quality in the river were initiated, mainly as the result of improvements made at the city of Delaware and the OECC WWTPs

to reduce levels of ammonia being discharged with treated effluent downstream of these facilities. (Figure 9-1)

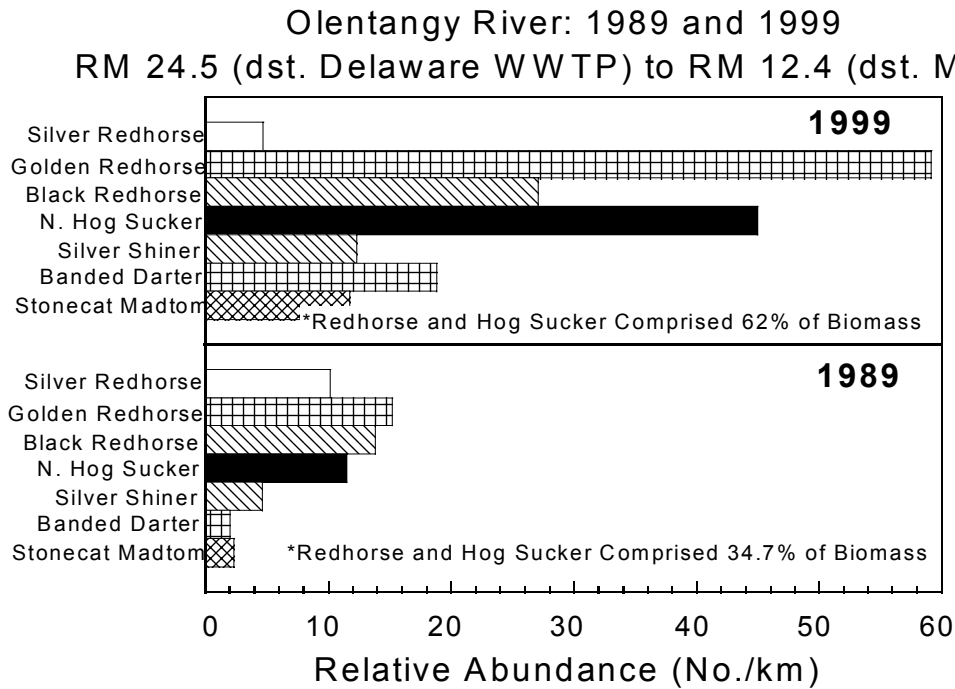


Figure 9-1: Changes in fish species abundance downstream of the Delaware WWTP, 1989 vs. 1999 (OEPA, 2001)

Good water quality conditions and good to excellent aquatic biotas are characteristic of those portions of the river that retain much of their original, natural configuration, especially being free-flowing with significant coarse-grained riffle zones and forested riparian banks. As might be expected, these areas are concentrated in the Scenic River portion of the Olentangy River in southern Delaware County. More of a surprise are the high quality habitats and biotas observed along select stretches of the river in heavily-urbanized portions of Clintonville in Franklin County, especially between Kenny Park and the mouth of Adena Brook, at the south end of Whetstone Park. These latter stretches of the river show that you can have sustainable growth in watersheds with minimal impacts on stream quality as long as natural instream habitat is preserved and sufficient riparian corridors are maintained. However, likely increases in the discharge of wastewater effluent to the river and strong development pressures in the watershed in southern Delaware County pose significant threats to the continued health of the river in and downstream of this area.

**What’s Not So Good About the River**

The generally good to excellent quality of the mainstem of the river north of the OSU campus are countered by poor water quality and low biological scores in the downstream portion of the river, especially near its confluence with the Scioto, within the city of Columbus. The main negative documented by Ohio EPA for the river mainstem in 1999 was the Non-Attainment of the use designations along this portion of the Lower Olentangy

River. The Non-Attainment of use designation along this portion of the river is the result of the negative impacts of a number of factors associated with stream flow through a heavily urbanized landscape. These include: 1) the lack of good instream and riparian habitat along these stretches of the river, primarily due to hydromodifications of the river carried out in the past to allow construction of homes, businesses, and industrial facilities on the river's flood plain; 2) the impacts of low-head dams, disrupting the free flow of the river, creating a series of isolated deep, stagnant, mud and muck-bottom "lakes" behind and upstream of these dams; environments that promote poor water quality conditions and that are not supportive of typical river bottom biotas; 3) the impacts of releases from storm drains, Combined Sewer Overflows, and faulty Sanitary Sewer Overflows, draining largely impermeable urban residential, commercial, and industrial areas; and 4) persistent toxic chemicals in river bottom sediments and the continued release of waste oils and other chemicals toxic to aquatic life from both active and defunct industrial facilities within the watershed.

Good fish scores and fair to good stream habitat scores for a few individual stretches of the river within the city of Columbus demonstrate that, with a little effort, these impacted stretches of the river might be improved enough to fulfill their use designations.

## **Report Card for the Olentangy River Tributary Streams**

In contrast to the generally good quality of the Lower Olentangy River mainstem, the tributary streams studied by Ohio EPA in the summer of 1999 did not score near as well. The average grade for the nine tributaries studied would be a "D". The poor scores, however, may partially reflect the drought conditions that existed for much of the 1999 field season and the ephemeral nature of stream flow in a number of the studied tributaries. The physical and hydrological characteristics of these streams – their short lengths, very high stream gradients, boom or bust flow patterns, and the impermeable nature of channels of these streams -- probably also contributed to seasonally stressful conditions for aquatic biotas living in these waterways. Ohio EPA's biological indices for perennial mainstem rivers may not be fully applicable for such ephemeral or poor-flow headwater streams.

### **What's Good about the Tributaries**

The good features associated with these tributary streams include their intrinsic, scenic natural beauty, especially those flowing in the larger ravines incised into the shale cliffs best developed along the east bank of the river, from north of High Banks Metro Park to just south of the OSU campus in Columbus. These ravines, especially the larger ones, are the sites of unique microhabitats that support equally unique biotas, especially a number of temperature- and humidity-sensitive plants species found only in these areas in the Central Ohio area.

Good in-stream habitat scores were recorded for Horseshoe Run, the upper reaches of Delaware Run, and the Lewis Center tributary, all in Delaware County; and for Bill Moose Run in Franklin County. Horseshoe Run, however, was the only tributary that had fish scores that met WWH aquatic criteria. Delaware Run, the Lewis Center tributary, Bill

Moose Run, and the lower part of Adena Brook failed to support WWH fish requirements but had “fair” fish biotas, dominated however, by “pioneer” and/or pollution-tolerant species. The Lewis Center tributary in Delaware County had the best the invertebrate community score (ICI), rating a “good”. “Fair” ICI scores were recorded for Bartholomew Run, Linworth Run, Rush Run, and Bill Moose Run. More pollution-tolerant forms like isopods, flatworms, and midge larvae, however, dominated bottom faunas in these streams.

### **What’s Not So Good about the Tributary Streams**

Many of the water quality criteria used by Ohio EPA to evaluate stream quality were found lacking with regard to the Lower Olentangy tributaries studied in 1999. All the sampled tributaries had significant bacteriological contamination with counts exceeding Ohio Water Quality Standards. The highest levels of *E. coli* and fecal coliform bacteria, as well as the pesticide dieldrin, were observed near the mouth of Turkey Run in Columbus. Low dissolved oxygen levels were detected in Horseshoe Run and Adena Brook. Nitrate and phosphorus levels exceeded proposed statewide WWH criteria in most all of the streams. Elevated metals were detected in sediments in Rush Run in Worthington.

Poor habitat quality scores, due to significant hydromodification of stream channels, were especially characteristic streams in urban areas. These included the lower part of Delaware Run in Delaware, Rush Run in Worthington, and the upper reaches of Adena Brook in Columbus.

Poor fish communities were observed in Linworth Run, Kempton Run, Rush Run, Turkey Run, and the upper part of Adena Brook, all in Franklin County. Poor bottom invertebrate faunas characterized urban tributaries, including Delaware Run, Turkey Run, and Adena Brook. These poor ICI scores were largely the result of a lack of good in-stream habitat in these urban areas coupled with impacts from stormwater run-off and discharges from CSOs and SSOs.

### **Defining the Problems**

The goal of this watershed inventory is to assess the state of the Lower Olentangy River Watershed -- to catalogue the natural resources present, assess the health and welfare of the river and its tributary streams, and to determine what is good and what is bad with regard to the river, its water quality, and resources. This information is to be used to “define the problem”. This includes defining the problems that are impacting those stretches of the river that do not currently fulfill their water quality use designations, identifying problem pollutants and their sources, identifying high quality stretches of the river that need protection, and identifying potential future threats to river water quality based on current trends documented for the watershed in the inventory report. This has resulted in a list of problems impacting water quality in the watershed that need to be addressed.

Based on this inventory report, the following is a list of existing problems and future threats to water quality and aquatic life in the Lower Olentangy River Watershed. Those identified here include:

### **Scenic River Portion of the River in Delaware County:**

- Continued adverse impacts on water quality in the mainstem of the river from six lowhead dams in Delaware County, impeding the free flow of the river, destroying in-stream habitat, and lowering water quality, plus obstructing movement of fish and mussels as well as canoes and kayaks up and down the length of the river.
- Increased releases of treated effluent from city of Delaware and OECC WWTP to the river leading to increased nutrient loads – nitrate and phosphorus – to downstream portions of the river.
- Threats from the intensive development planned and currently underway in the southern Delaware County portion of the watershed. Including impacts in distal portions of the watershed from the expansion of existing roads and construction of new roads, subdivisions, and infrastructure. This will lead to increases in the amount of stormwater runoff and sediment entering the headwaters of tributary streams (U.S. Rt. 23 and Sawmill Road corridors); as well as developments encroaching on the floodplain of the mainstem of the river itself (example: Bodycombe property at Mt. Air).
- Potential impacts on the river from the proposed construction of the by-pass around the city of Delaware and the widening of State Rt. 315 in the vicinity of High Banks Metro Park, immediately adjacent to the most biologically diverse stretch of the river.
- Potential for increased demands on streamflow in the river from the city of Delaware and the DelCo Water Company water systems as populations served by these utilities continue to rapidly grow.
- Influence of the old municipal landfill along the river may be chronically contributing pollutants, particularly the pesticides found in the Delaware area.

### **Urban Section of the River in Franklin County:**

- Continued adverse impacts on water quality in the mainstem of the river from six lowhead dams in Franklin County, impeding the free flow of the river, destroying in-stream habitat, and lowering water quality, plus obstructing movement of fish and mussels as well as canoes and kayaks up and down the length of the river. Additionally, the dam downstream on the Scioto impounds the mouth.
- Continued impacts to Olentangy River water quality from stormwater runoff from impermeable urban areas and discharges of raw sewage from CSO and SSO overflows and failing septic tanks or aeration systems scattered throughout the Lower Olentangy River watershed within Franklin County.

- Continued construction in riparian corridors flanking the river within Columbus, leading to the destruction of already minimal forested habitat and increased erosion and transport of soils to the river from these construction sites (Riverside Hospital parking lot expansion and expansion of the Olentangy Village Apartments).
- Continued releases of waste oil and other chemical contaminants toxic to aquatic life to the river from long-standing industrial point sources (Timken Products facility off of Cleveland Avenue and the A. C. Humko facility on the river below the 3<sup>rd</sup> Avenue bridge) in addition to the old Gowdy landfill.
- Continued threats to river quality and aquatic life from spills and releases due to infrastructure failures like pipeline ruptures, traffic accidents, and road salt run-off.
- Potential for adverse impacts on river water quality and flood plain integrity from proposed bridges over the Olentangy River at Lane Avenue and the ramps from State Rt. 315 to the OSU campus above the Fifth Avenue bridge.

### **Lower Olentangy River Tributary Streams**

- Highly elevated bacteriological contamination in all of the studied tributary streams.
- Continued degradation of stream quality and lack of attainment of water quality use designations for nearly all of the studied streams, especially those in urban portions of Delaware and Columbus.
- Increasing threats to water quality to southern Delaware County tributaries due to explosive development, increasing impervious surface areas across this part of the watershed, coupled with the hydrologic nature of the tributaries, leading to negative impacts on water quality in both the tributary streams and the mainstem of the river.

### **Where Do We Go from Here?**

The next step in this process of formulating a plan to protect the good quality stretches of the river and to address those identified problems, either currently impacting the river and its tributaries or posing a future threat to the watershed, is to develop an Action Plan or Plans to address these issues. This may involve doing further investigations of water quality in the Lower Olentangy River watershed if it is warranted (as probably is the case with the tributary streams), evaluating potential solutions for identified problems, setting goals based on measurable indicators, and selecting solutions that will achieve these goals (Figure 1-1).

As indicated above, the difficulty in this process is determining which of these factors is impacting water quality the most and which are amenable to corrective measures. What is most doable at the least cost? A significant factor to be considered when addressing these

problems in this already largely urbanized watershed is the need to work around pre-existing human infrastructures, setting up the potential for conflicts between individual property rights, the need for essential municipal services like water, sewer, and drainage, and the desire to make the watershed a better place for everybody, watershed animals and plants as well as humans. This will require a consensus approach involving all of the various stakeholders living, working, or recreating in the watershed in order to be successful. Forming this consensus will be the next and probably most important part of this watershed advocacy process.