

Appendix 8-2

Assessment of Regional Wastewater Collection and Treatment Needs in Ohio

Water Quality Information for Franklin County and Current Community Wastewater Information for Franklin County¹

¹ Test extracted without modification from Water Quality Management Plan -
- Scioto River Basin and Blacklick Creek, 2002 (a.k.a. Central Scioto Plan
Update). Basic water quality assessment conclusions remain valid, although
some details regarding dates, permit status, etc. are not current. See
Appendix 8-1 for more recent wastewater permit information.

3 Description of the Area and Water Quality Assessment

This section contains general descriptions of land use, population trends and water quality within the Columbus Metropolitan Facility Planning Area. Summarized information on water quality in the major rivers and smaller streams is presented in Section 3.02 based upon data reported in the last published Section 305(b) report (Ohio EPA, 2000). See Appendix 6 for the applicable 305b report material. Other available water quality reports are listed in the reference section. The water quality conditions of Blacklick Creek are described in greater detail in Section 3.04.

3.01 General Description of Facility Planning Area

The Columbus Metropolitan Facility Planning Area is depicted in Appendix 1, Fig. 2. The area is comprised of all of Franklin County, portions of Fairfield County in Violet, Bloom and Greenfield townships, portions of Licking County in Etna, Jersey and Monroe townships, portions of Delaware County in Harlem, Orange, Concord and Genoa townships and portions of Union County in Jerome Township. All the villages, municipalities and unincorporated areas within this boundary are included.

Columbus has experienced a substantial growth in population and land area since 1950 (Table 1). The most rapidly growing areas are near the outer boundary of the FPA (see Appendix 1, Fig. 3). Surrounding communities have experienced similar growth in population in the last decade. As a result of this growth in population the land use cover in Franklin County has undergone substantial change. Almost 50,000 acres of farmland in Franklin County has been converted to urban land cover between 1982 and 1997 (Table 2).

Table 1. Columbus square mileage and population, 1950 - 2000.
(Source City of Columbus, Planning Division)

| Year | Approximate Square Mileage | Total Population |
|------|----------------------------|------------------|
| 1950 | 42 | 375,901 |
| 1960 | 93 | 471,316 |
| 1970 | 146 | 540,025 |
| 1980 | 186 | 564,871 |
| 1990 | 201 | 632,910 |
| 2000 | 220 | 711,470 |

Table 2. County land cover change in Franklin County, Ohio, 1982 to 1997. (Source National Resource Inventory, as reported by the Exurban Exchange Project, OSU Extension)

| Land Cover | 1982 to 1987 | | 1987 to 1992 | | 1992 to 1997 | | 1982 to 1997 | |
|--|------------------|----------------|------------------|----------------|------------------|----------------|------------------|----------------|
| | Absolute Change* | Percent Change |
| Urban Land | 12 | 6.8% | 11.5 | 6.1% | 25.6 | 12.8% | 49.1 | 27.9% |
| Forest Land | 0.8 | 4.5% | 0.3 | 1.6% | -3.2 | -16.9% | -2.1 | -11.8% |
| Total Farmland** | -12.2 | -9.3% | -13.3 | -11.2% | -24 | -22.8% | -49.5 | -37.9% |
| Crop Land | -10.4 | -8.9% | -12.4 | -11.6% | -27.6 | -29.3% | -50.4 | -43.1% |
| Pasture Land | -1.8 | -13.0% | -0.9 | -7.5% | 3.6 | 32.4% | 0.9 | 6.5% |
| *Absolute Change measured in thousands of acres | | | | | | | | |
| **Total Farm Land equals sum of all crop land and all pasture land | | | | | | | | |

Topography in the Columbus FPA is generally flat to rolling without significant relief. The boundaries of the FPA have been determined in part based upon the extent to which gravity flow sewers can serve the area. Several major waterways all flow from north to south offering a significant recreational resource. A master plan for Greenway development has been produced (MORPC, 1997).

3.02 Summary of Water Quality Conditions

Current water quality conditions found in the four largest streams in Franklin County are generally good to excellent (see Table 3). Very marked improvement in the condition of the Scioto River has been well documented in past Ohio EPA reports (Ohio EPA 1996). This was attributed to upgraded wastewater treatment at both Columbus facilities. Based on the most recent data available, 16 percent of the evaluated stream miles on these four larger waterways were rated fair or poor, indicating an unacceptable level of water quality. Combined sewer overflows and urban and storm water runoff still impact segments of the Scioto River, Olentangy River and Alum Creek (Ohio EPA 1999, Ohio EPA 2000). Habitat alterations caused by low head dams are another factor that affects water quality and the biological communities living in these waters. The following is a summary from the most recent study of the Olentangy River (Ohio EPA 2001).

“The Olentangy River had generally good water quality, except for a few minor violations of water quality standards for bacteria and pesticides. Low concentrations of pesticides were detected in every sample obtained from the Olentangy River mainstem. Mean dissolved oxygen concentrations were above 6 mg/l and nutrient concentrations, though often elevated, did not seem to impact the free-flowing portions of the river. Upstream from the Columbus metropolitan area, both fish and macroinvertebrate communities were in good to exceptional condition. Among the fish species collected were two classified as endangered, threatened, or special status - river redhorse and bluebreast darter.

“The lower four miles of the Olentangy River demonstrated the combined effects of CSOs/SSOs, urban runoff and habitat modifications associated with an urbanized watershed. Use designations have been applied that account for the modified habitats resulting from the lowhead dams in the area. Nevertheless, the macroinvertebrates in both the Modified Warmwater Habitat (MWH) and Warmwater Habitat (WWH) areas were significantly impacted in this reach. Sampling results documented increasingly more tolerant communities in a downstream direction. In addition to the poorly performing macroinvertebrate communities, contaminated sediments were also documented in the dam pools. The fish assemblages in the dam pools met the MWH use and were apparently not affected by the accumulation of material in the pooled areas. As a result, much of this area was considered to be in partial attainment of the designated aquatic life uses.

“Contaminated sediments in the mainstem and sampled tributaries were concentrated within the urban areas of Columbus. Mainstem sites in the Columbus urban area within the last two miles of the mouth were moderately to severely

contaminated with metals and organic compounds. Of the significant tributary streams, Delaware Run, Rush Run and Adena Brook showed the highest degree of metals and/or organic contamination. Less severe levels of contamination were noted in the other urban tributaries sampled.” (Ohio EPA 2001)

In contrast to the larger rivers and streams, the water quality of smaller waterways in the older, heavily urbanized areas of Franklin County is seriously degraded. Only four of 24 direct tributaries to the Scioto River, Olentangy River and Alum Creek received water quality ratings of good or marginally good (Ohio EPA 2000). Over 80 percent of these small urban waterways were rated as fair, poor or very poor (see Table 4). The water quality problems appear to come from a variety of sources including sewer system overflows, industrial and urban runoff and habitat issues such as siltation and intermittent flow. The top causes of water quality impairment in Franklin County are siltation, organic enrichment/dissolved oxygen, habitat alterations (other than flow alterations), nutrients, flow alterations and pathogens. These pollution problems cause the most severe impacts over the most stream mileage in Franklin County streams. The residential, commercial and industrial land use development that has occurred in Franklin County over the past 50 plus years has created a legacy of polluted streams that will need substantial investments to clean up and some impacts are likely irreversible.

Table 5 presents the water quality ratings for streams and smaller waterways in the less urbanized areas of Franklin County and portions of Pickaway and Fairfield counties. Current water quality in these waterways is much better with approximately 70% rated as excellent, very good or good. Localized water quality problems are most severe in western Franklin County (Hellbranch Run watershed) and in Mason Run located in east Columbus/Whitehall. The very poor conditions of Mason Run are attributable to urban runoff and the fact that long reaches of the stream have been placed in culverts. The tributaries of Hellbranch Run have been ditched for agricultural drainage. More recently, residential development in the Hellbranch Run watershed and the resulting poor habitat, siltation and flooding has become a concern. Negative water quality impacts caused by land use changes from rural to residential and commercial developments are evident in the Rocky Fork and its tributaries and other small streams.

Table 3. General water quality conditions reported for the four largest waterways in Franklin County, Ohio. Big Darby Creek and smaller waterways are included in Tables 4 and 5. (Source: Ohio EPA 2000; Ohio EPA 2001 for Olentangy River)

| Waterway | Condition | Miles Rated | Description of Segment | River miles (RM) | Comments |
|---|-----------|-------------|--|------------------|--|
| Scioto River | Good | 4 | downstream of Oshaughnessy Dam | 148 - 145 | |
| | Good | 1 | Griggs Reservoir to Olentangy River | 145 - 132 | |
| | Excellent | 12 | | | |
| | Good | 8 | Olentangy River to near I-270 south | 132 - 124 | Jackson Pike WWTP at RM |
| | Excellent | 7 | near I-270 south to Big Walnut Creek | 124 - 117 | Southerly WWTP at RM |
| | Excellent | 11 | Big Walnut Creek to Walnut Creek | 117 - 106 | segment is in Pickaway County |
| Olentangy River | Very Good | 8 | Just north of Franklin Co. line to mouth | 15 - 0 | Delaware Co. Olentangy WWTP at RM 13.4; impoundment in lower reach |
| | Good | 1 | | | |
| | Fair | 6 | | | |
| Big Walnut Creek | Good | 5 | Three Rivers Park to mouth | 15 - 0 | |
| | Good | 12 | Rocky Fork (Gahanna) to mouth | 28 - 15 | |
| | Fair | 1 | | | |
| Alum Creek | Good | 7 | Alum Creek Dam to Schrock Rd. | 27 - 20 | |
| | Fair | 8 | Schrock Rd. to mouth | 20 - 0 | |
| | Poor | 1 | | | |
| | Good | 10 | | | |
| Miles (percent) rated Excellent - 30 (29%) Miles (percent) rated Fair - 15 (15%) Miles (percent) rated Very Good - 8 (8%) Miles (percent) rated Poor - 1 (1%) Miles (percent) rated Good - 48 (47%) | | | | | |

Table 4. General water quality conditions of small waterways in the more urbanized areas of Franklin County. (Source Ohio EPA 2000)

| Waterway | Condition | Miles Rated | Nearby Community, landmark | Comments * |
|---|-----------------|-------------|---|---|
| Scioto River tributaries | | | | |
| Republican Run | Good | 4 | Grove City, Stringtown Rd. | |
| Plum Run | Marginally Good | 1 | Grove City, SR 104 & London-Groveport Rd. | threatened by land use changes |
| Scioto Big Run | Poor | 3 | southwest Columbus | siltation and habitat problems; development |
| | Marginally Good | 2 | | |
| Marsh Run | Fair | 5 | Grove City, near I-270 | CSO elimination has improved condition |
| Brown Run | Poor | 6 | Grove City, near I-71 | commercial and residential land use impacts |
| Trabue Run | Poor | 5 | west Columbus, Trabue Rd. | large railyard, spills and fish kills in past |
| Cramer Ditch | Very Poor | 3 | | raw wastewater enters stream from sewer system |
| Dry Run | Poor | 2 | Valley View / west Columbus | industrial runoff and package plant impacts |
| Slate Run | Very Poor | 2 | Upper Arlington, Henderson Rd | unknown cause and source |
| Hayden Run | Poor | 1 | west Columbus / Hilliard | point sources |
| N. Fork Indian Run | Poor | 1 | Dublin, I-270 | commercial and residential land use; development |
| S. Fork Indian Run | Fair | 3 | Dublin, Post Rd. | high silt load; agricultural land use and channelization; development |
| Olentangy River Tributaries (updated conditions reported in Ohio EPA 2001) | | | | |
| unnamed @ RM 7.8 | Poor (Fair) | 3 (1) | north Columbus | urban runoff (chemical water quality) and flow impact |

| Waterway | Condition | Miles Rated | Nearby Community, landmark | Comments * |
|--|-----------------|--|----------------------------------|---|
| Kempton Run | Poor (Poor) | 3 (1) | Linworth, Don Scott airport | urban runoff (chemical water quality) and flow impact |
| Linworth Run | Fair (Poor) | 3 (2) | Linworth | urban runoff (chemical water quality) and flow impact |
| Turkey Run | Poor (Poor) | 4 (2) | Upper Arlington, OSU golf course | urban runoff (chemical water quality) and flow impact |
| Adena Brook | Poor (Poor) | 2 (2) | Clintonville, Whetstone Park | industrial discharge has caused fish kills; suspected SSO, CSO, urban runoff |
| Rush Run | Poor (Fair) | 2 (2) | Riverlea / Worthington | raw wastewater enters stream from sewer system |
| Alum Creek Tributaries | | | | |
| Spring Run | Fair | 3 | Westerville, Inniswoods Gardens | high silt load and channelization from commercial and residential development; urban runoff |
| | Poor | 4 | | |
| unnamed @ RM 14.1 | Poor | 1 | northeast Columbus, Innis Park | urban runoff (chemical water quality) and flow impact |
| Meacham Run | Marginally Good | 2 | | threatened by land use changes |
| Noble Run (Spring Hollow) | Good | 2 | | threatened by land use changes |
| Miles (percent) rated Good - 6 (9%) | | Miles (percent) rated Poor - 37 (55%) | | |
| Miles (percent) rated Marginally Good - 5 (7.5%) | | Miles (percent) rated Very Poor - 5 (7.5%) | | |
| Miles (percent) rated Fair - 14 (21%) | | | | |

* Some comments derived from file records of problematic construction site practices.

Table 5. General water quality conditions of streams and smaller waterways in the less urbanized areas of Franklin County and surrounding counties. (Source Ohio EPA 2000, file records)

| Waterway | Condition | Miles Rated | Nearby Community, landmark | Comments * |
|--|-----------------|-------------|---|---|
| Big Walnut Creek Tributaries | | | | |
| unnamed @ RM 12.7 | Fair | 3 | Obetz | habitat issues |
| unnamed @ RM 27.3 | Poor | 1 | Columbus Airport | airport runoff; habitat, siltation issues |
| Mason Run | Very Poor | 4 | east Columbus / Whitehall; mouth is near Eastland Mall | channelization, ~ 1.5 miles in culvert; urban runoff and other unknown causes |
| | Fair | 2 | | |
| Rocky Fork | Excellent | 1 | northeast Columbus / Gahanna / New Albany / Jefferson & Plain Twps. | siltation a major impact in lower segment; impacts from past and ongoing development |
| | Good | 3 | | |
| | Fair | 10 | | |
| Rose Run | Fair | 1 | | siltation caused by development |
| Sugar Run | Good | 6 | New Albany | siltation caused by development |
| Sycamore Run | Marginally Good | 1 | Gahanna, SR 62 | siltation caused by development |
| Blacklick Creek and Tributaries | | | | |
| Blacklick Creek | Good | 17 | east Columbus / Reynoldsburg / New Albany | point source impacts have lessened; threatened by development |
| | Fair | 10 | | impacts from intermittent flow, livestock wastes |
| Dysar Run | Good | 5 | east Columbus / Reynoldsburg | threatened by development |
| tributary to Dysar | Good | 2 | east Columbus / Reynoldsburg | threatened by development |
| unnamed @ RM 6.5 | Marginally Good | 1 | east Columbus / Brice | threatened by development |
| unnamed @ RM 10.4 | Good | 1 | Summerfield / Violet Township | |
| unnamed @ RM 11.3 | Good | 1 | Violet Township, SR 204 | threatened by development |

| Waterway | Condition | Miles Rated | Nearby Community, landmark | Comments * |
|-------------------------------------|-----------------|-------------|-----------------------------------|--|
| unnamed @ RM 12.9 | Good | 1 | Reynoldsburg, Livingston Ave | threatened by development |
| French Run | Marginally Good | 1 | Reynoldsburg, Main Street | threatened by development |
| North Branch French Run | Excellent | 4 | Reynoldsburg | threatened by development |
| Swisher Creek | Good | 1 | Jefferson Township | threatened by development |
| Walnut Creek and tributaries | | | | |
| Walnut Creek | Good | 24 | Canal Winchester | portions in Pickaway and Fairfield counties |
| Manns Run | Fair | 2 | Groveport, Rickenbacker Airport | mobile home park package plant |
| unnamed @ RM 15.5 | Poor | 1 | Groveport, Rickenbacker Airport | |
| unnamed @ RM 15.6 | Good | 1 | Groveport, Rickenbacker Airport | |
| Mud Run | Good | 4 | Lithopolis, SR 674 | rural agricultural watershed |
| Big Run | Good | 4 | Lithopolis, SR 674 | rural agricultural watershed |
| Georges Creek | Good | 2 | southeast Columbus / Pickerington | channelization and threats from land use changes |
| | Fair | 7 | | |
| tributary to Georges Creek | Good | 4 | southeast Columbus / Pickerington | threatened by land use changes |
| | Fair | 5 | | |
| Tussing Ditch | Good | 1 | Canal Winchester | |

| Waterway | Condition | Miles Rated | Nearby Community, landmark | Comments * |
|---|------------------|-------------|----------------------------|---|
| Sycamore Creek | Good | 13 | Pickerington | located in Fairfield County; Pickerington WWTP and smaller plants; threatened by land use changes |
| | Fair | 1 | | |
| Gillete Run | Good | 7 | Carroll, SR 33 | improved condition after WWTP upgrade |
| Big Darby Creek and tributaries | | | | |
| Big Darby Creek | Excellent | 6 | | threatened by suburban development |
| | Excellent / Good | 7 / 4 | | threats from poorly run package plants, nutrients, unsewered areas |
| | Excellent | 8 | | |
| | Excellent | 13 | | mostly in Pickaway County; threatened by land use changes |
| Hellbranch Run | Very Good | 4 | | threatened by development in headwaters |
| | Good | 4 | | threatened by development in headwaters |
| | Fair | 5 | | impacted by development |
| Clover Groff Ditch | Poor | 9 | | past channel modification; land use changes |
| Hamilton Ditch | Fair / Poor | 1 / 2 | | past channel modification; land use changes |
| Miles (percent) rated Excellent - 39 (18%) Miles (percent) rated Fair - 47 (22%) Miles (percent) rated Very Good - 4 (2%) Miles (percent) rated Poor - 13 (6%) Miles (percent) rated Good - 105 (49%) Miles (percent) rated Very Poor - 4 (2%) Miles (percent) rated Marginally Good - 3 (1%) | | | | |

* Some comments derived from file records of problematic construction site practices.

3.03 Blacklick Creek - Watershed Description

Blacklick Creek flows from its headwaters in western Licking, southern Delaware and northeast Franklin counties in a southerly direction, past the Village of Blacklick and through the City of Reynoldsburg before turning southwest and joining Big Walnut Creek at the Alum Creek confluence in southeast Franklin County. Blacklick Creek is approximately 31 miles long and drains an area of 61.3 square miles. The Blacklick Creek basin is comprised mainly of small headwater streams flowing into the mainstem. Blacklick Creek is located in the Eastern Corn Belt Plains (ECBP) ecoregion of Ohio. The gently rolling glacial till plain comprising the ECBP ecoregion is broken by moraines, kames and outwash plains. Local relief is generally less than 50 feet. Soils derived from glacial till materials contain substantial amounts of clay and soil drainage is often poor. Many of the smaller streams in the ECBP ecoregion have been channelized to assist soil drainage.

Within the drainage basin, Franklin County Metroparks has a number of holdings, including Blacklick Woods and Three Creeks metroparks. There are eight golf courses in the watershed, which include Winding Hollow Country Club, The Golf Club, Jefferson Golf and Country Club, New Albany Links, Blacklick Woods Golf Course, Turnberry Golf Course, Walnut Hill Golf Course and New Albany Country Club.

A mixture of rural residential lots (1-5 acres) and suburban housing development is the predominant and increasing land use in the study area. Agricultural land uses are present in the headwaters, but represent a relatively small portion of the total land use in the watershed. The main population centers in the watershed area are the cities of Columbus, Gahanna, Groveport, New Albany, Pataskala, Pickerington and Reynoldsburg. A map showing the watershed boundary and corporation limits is in Appendix 1 Fig. 4. Existing and historical populations of communities and census defined places located partially or entirely in the watershed can be found in Table 6.

Table 6. Total population of incorporated areas* in the Blacklick Creek watershed.

| Entity | Population | | |
|-----------------------|------------|---------|---------|
| | 2000 | 1990 | 1980 |
| Blacklick Estates | 9,518 | n.a. | n.a. |
| Village of Brice | 70 | 109 | 93 |
| Village of New Albany | 3,711 | 1,621 | 409 |
| City of Columbus | 711,470 | 632,910 | 565,021 |
| City of Gahanna | 32,636 | 27,791 | 18,001 |
| City of Groveport | 3,865 | 2,948 | 3,286 |
| City of Pataskala | 10,249 | 3,046 | 2,284 |
| City of Pickerington | 9,792 | 5,668 | 3,917 |
| City of Reynoldsburg | 32,069 | 25,748 | 20,661 |

*based upon 2000 and earlier Census figures. Population shown is entire population for incorporated area, not all of which is in the watershed.

As can be seen from the comparison of census counts, there has been an increase in population on the part of municipalities located in the watershed. Significant development is on-going in the county areas, particularly within Franklin and Fairfield. In excess of 1,000 acres is currently under residential construction, with associated commercial construction underway. Construction site erosion and streambank modification are the predominant types of nonpoint source (NPS) pollution in the study area. Other types of NPS pollution known or suspected include agriculture, on-site wastewater treatment and urban runoff.

Table 7 shows an approximate representation of the number of acres each entity in the watershed covers (incorporated and unincorporated).

Table 7. Land area in Blacklick Creek watershed by governmental entity.

| Entity | Acreage | % of Watershed |
|-------------------------------|---------|----------------|
| City of Columbus | 6,664 | 17 |
| Jefferson Twp. (Franklin Co.) | 6,367 | 16.2 |
| City of Reynoldsburg | 6,313 | 16.1 |
| Jersey Twp. (Licking Co.) | 4,608 | 11.7 |
| City of Pataskala | 3,566 | 9.1 |
| Plain Twp. (Franklin Co.) | 2,723 | 6.9 |
| Etna Twp. (Licking Co.) | 2,499 | 6.4 |
| Madison Twp. (Franklin Co.) | 2,179 | 5.5 |
| Violet Twp. (Fairfield Co.) | 1,445 | 3.7 |
| Village of Groveport | 1,434 | 3.7 |
| Village of New Albany | 962 | 2.5 |
| City of Pickerington | 406 | 1.0 |
| Truro Twp. (Franklin Co.) | 358 | 0.9 |
| City of Gahanna | 337 | 0.8 |
| Monroe Twp. (Licking Co.) | 203 | 0.5 |
| Harlem Twp. (Delaware Co.) | 100 | 0.3 |
| Village of Brice | 52 | 0.1 |

3.04 Blacklick Creek - Water Quality

Ohio EPA has employed biological, chemical and physical monitoring and assessment techniques (biosurvey) to determine: 1) the extent to which “use designations” assigned by the Ohio Water Quality Standards (WQS) are either attained or not attained; 2) if use designations assigned to a given water body are appropriate and attainable; and 3) if any changes in key ambient biological, chemical, or physical indicators have taken place over time, particularly before and after the implementation of point source pollution controls or storm water best management practices.

This biosurvey work was done on twenty-three miles of Blacklick Creek and its larger tributaries in 1996 and a Technical Support Document (TSD) was written in 1998 (Ohio EPA 1998). The survey included a total of 29 biological, chemical/physical and sediment stations, encompassing the mainstem from the headwaters (River Mile (RM) 23.0) to near the mouth (RM 1.4). Previous biosurveys of Blacklick Creek were conducted by Ohio EPA

in 1991, 1989, 1987 and 1986. Each of these efforts evaluated a portion, but not all, of the mainstem. The stream reach between RM 20.4 (Havens Road) and RM 16.5 (SR 16) was previously designated Exceptional Warmwater Habitat (EWH). The remaining segments (upper and lower) are designated Warmwater Habitat (WWH). The complete TSD is available on-line at our web site (see reference section). Aquatic life use attainment status for existing and recommended use designations in the 1996 TSD are presented in Appendix 7. Appendix 8 contains the current water quality standard use designations that became effective on March 29, 2001. These use designations were derived from the TSD.

A graphical evaluation of ambient biological performance in Blacklick Creek is presented in Appendix 1, Fig. 5.

The results from the 1996 biosurvey found 14.7 miles (64.8%) of Blacklick Creek in full attainment of existing aquatic life uses. Partial attainment was indicated for 3.6 miles (15.9%), while non-attainment was observed for the remaining 4.4 miles (19.3%). Impairment (partial and non-attainment) was limited to two river segments. The first extended from the WWH designated headwaters (RM 22.7), through the EWH reach, to Hill Road (RM 15.5). The second included the lower 1.8 miles. Within the headwaters (RM 22.4/22.7) both the fish and benthic macroinvertebrate communities performed at a fair level. As documented in a previous investigation (Ohio EPA 1992 unpublished), intermittent stream flow was again observed within the upper reaches of Blacklick Creek in 1996. This, coupled with failed on-site septic systems and a significant manure release further upstream, were the principal associated sources of aquatic life use impairment within this area. Apparently, livestock wastes were improperly applied to adjacent agricultural fields within the extreme headwaters of Blacklick Creek (Ohio Department of Natural Resources (DNR) 1996). Following an extended period of rainfall in mid-August, manure laden runoff was delivered to Blacklick Creek near RM 27.0¹. Despite the lack of perennial flow and the stressors identified above, ambient water quality within the upper limits of the formal study area (RM 23.0) was generally good. At this station, dissolved oxygen (DO), nutrients, ammonia-N, solids and fecal bacteria were all found at acceptable levels. Only biochemical oxygen demand (BOD) was elevated. However, in response to citizen complaints regarding the manure release, additional water chemistry samples were collected further upstream near RM 27.0. Results from this effort indicated low DO, elevated nutrients and fecal bacteria contamination in the immediate area of the spill. Progressing downstream, into the EWH designated reach, community performance was markedly improved as stream discharge became continuous. However, all four sampling stations contained within this segment failed to support exceptional biological assemblages. Despite this, most stations did fully support WWH communities. The TSD recommended re-designation of the EWH segments of Blacklick Creek to WWH, based on their apparently natural inability to consistently support EWH.

¹ Episodes of manure discharge from the Hendren Farms on Beech Road have continued and Ohio EPA is pursuing the issuance of an NPDES permit. See additional discussion in Section 6.

After meeting with the working group as a part of the plan update, Ohio EPA determined that more information about the existing point sources, stream bank conditions of the entire mainstem and a more current biosurvey was needed to develop an areawide waste treatment management plan. In June 2000, Ohio EPA performed another biosurvey and re-evaluated the wastewater treatment systems. In addition, Ohio EPA through a consulting firm obtained the Global Positioning System (GPS) locations of: 1) all discharge pipes, 2) tributaries, 3) obstructions and 4) stream bank conditions along the mainstem (see Appendix 9).

Ohio EPA sampled 13 Blacklick Creek mainstem and several tributary sites for biological attainment in 2000. As shown on the map, non-attainment of WWH biocriteria occurred in the upper mainstem of Blacklick Creek and Powell Ditch. The assessment of non-attainment was for all WWH biocriteria at Walnut Street (RM 27.1), SR 161 (RM 24.6) and upstream from Morse Road (RM 27.4 and 23.0). Biological index scores attained were in nonsignificant departure of all biocriteria at all nonmixing zone sites sampled between Havens Road (RM 20.4) and Hamilton Road (RM 2.6). Dysar Run, French Creek and North Branch French Creek appeared to have met WWH biocriteria, with Powell Ditch meeting only partial attainment of WWH biocriteria.

A comparison of the biocriteria scores obtained in 2000 with those of 1996, indicate that even with re-designation to WWH, the upper mainstem was still in non-attainment. Identified causes for non-attainment in this reach appear to be intermittent flow, redirection of storm water due to new housing developments, home aeration system discharge from old housing developments and manure laden farm field run-off from farms in the area. When farm field runoff is noted during surveys and inspections, Ohio EPA coordinates closely with Soil and Water Conservation District staff who provide technical assistance to farmers to ensure proper application occurs in the future.

The rest of the Blacklick Creek mainstem appeared to have slightly higher biological index scores than the previous survey in 1996. These results are tentative and based on preliminary examination of biological scores. A more detailed analysis of water quality in Big Walnut Creek is anticipated as part of the upcoming Total Maximum Daily Load (TMDL) report for this watershed.

The 1998 TSD did find that since 1986 significant improvements had occurred in the Blacklick Creek mainstem, mainly attributable to wastewater treatment plant upgrades that had taken place since 1986. It also found that Blacklick Creek is likely near the assimilative capacity needed to maintain the WWH use. Biological indicators (fish and macroinvertebrates) were frequently at, or just below, the minimum WWH thresholds (IBI, MIwb and ICI). These results suggest that additional stress would likely expand, significantly, the areas of modest impairment (partial and non-attainment) documented in 1996.

The 1998 TSD notes that an additional threat to the integrity of Blacklick Creek includes suburban development pressures. It noted that as measured by the frequency of General Storm Water Permits (GSP), development had increased substantially over the last four

years. These activities were most pronounced in the portion of the watershed contained in Franklin County. Within this area the issuance of GSPs had risen from an average of 2.5/year, prior to 1994, to 12.5/year in 1998. The deleterious effects of this intensive land use were noted to include: construction site runoff (primarily sediment), modification of the flow regime (increased runoff rates), riparian encroachment or removal and, at times, direct channel modification. The impacts to flow regime seen are two-fold: lower dry weather flows combined with higher wet weather flows. Collectively, these factors have been found to negatively impact the quality of surface water resources through the degradation of physical habitat (e.g., sedimentation, riparian removal and "flashy" hydroperiod) and lowering of chemical/physical quality of the water column itself (e.g., urban runoff, nutrients, lower summer flows and higher instream temperatures).

The 1998 TSD went on to state, "Ultimately, the maintenance of the WWH use and the recovery of impaired segments, is directly threatened by an anticipated increase of wastewater flows and land use changes, that will follow suburban development within the basin. To date, the WWTP upgrades have substantially advanced aquatic life use attainment in Blacklick Creek in comparison with pre-upgrade surveys. However, the ability of Blacklick Creek to safely continue to assimilate additional wastes without accruing environmental damage, or returning to its once degraded state, may be nearing capacity. Although a direct, clear and compelling link between the modest impairment documented in 1996 and effluents discharged by the WWTPs within the basin was not established, the conditions for granting future increases in effluent volumes should be conservative. Careful consideration must be given to the potential instream effects of additional pollutant loads if the improvements in Blacklick Creek are to be maintained into the future."

The 1998 TSD also observed, regarding land development impacts, that "every effort should be made to prevent and abate associated problems. Successful stream protection may be achieved through the implementation of construction site and storm water BMPs, the maintenance, or reestablishment, of permanent wooded riparian corridors on the mainstem and all Blacklick Creek tributaries and the avoidance of any direct channel modification to the mainstem or any Blacklick Creek tributary." Recent discussions with Agency water quality monitoring and assessment staff who have been assessing the watershed confirm that this continues to be a very important threat to water quality in the watershed, particularly in headwater stream watershed areas. These individuals have noted that unless the issues noted above are addressed in tributary streams, the mainstem of Blacklick Creek will decline in water quality beyond the point of full restorability.

4 Wastewater Treatment Facilities, Home Sewage Treatment and Disposal Practices and Future Needs

4.01 Description of Existing Municipal Systems

4.01.01 City of Columbus Jackson Pike WWTP

The Jackson Pike Wastewater Treatment Plant (WWTP) located at 2104 Jackson Pike is one of two treatment works serving the Columbus metropolitan area. Under the City of Columbus's "Project '88" and into the years beyond (1989-1992) substantial upgrades were made to the original facility that was built in 1937. In addition, as part of Project '88, a large interconnector sewer was constructed connecting the Jackson Pike WWTP with the Southerly WWTP, thus enabling some sewage flow to be diverted to the Southerly WWTP for treatment and allowing the Jackson Pike WWTP to maintain a high degree of treatment. It currently has an average design flow of 68 million gallons per day (mgd) during dry weather. A maximum wet weather flow analysis determined that the Jackson Pike WWTP could treat at least 70 mgd during "any condition flow," which is the maximum wet weather instantaneous flow the plant is expected to meet at all times. The ideal condition flow is to reflect the maximum wet weather treatment capabilities of the plant when everything is working at its best. The ideal condition flow was found to be 115 mgd. The Jackson Pike WWTP treats wastewater collected from areas of Columbus that are mostly located within the Interstate Route 270. This also includes most of the industrial indirect users. As per the Columbus 2001 Annual Pretreatment Report, both the Jackson Pike WWTP and the Southerly WWTP treat wastewater from 97 significant industrial users with 51 being federal categorical standard facilities. A renewal NPDES permit application has been submitted and is under review with issuance expected to occur in the winter of 2003. The plant discharges into the Scioto River at RM 127.1.

4.01.02 City of Columbus Southerly WWTP

The Columbus Southerly WWTP is the other treatment works serving the Columbus metropolitan area. The Southerly WWTP was constructed in the mid-1960s with expansions in 1971 and 1987. The plant is located south of Columbus at 6977 South High Street, Hamilton Township, Franklin County. This WWTP is currently permitted to treat an average daily flow of 114 mgd and discharges treated wastewater to the Scioto River at RM 118.4. A renewal NPDES permit application has been submitted and is under review with issuance expected to occur in the winter of 2003.

The Southerly WWTP treats a majority of the sewered area in the Big Walnut Creek, Alum Creek and Blacklick Creek watersheds. Columbus has sized its sewers to eventually service the entire Blacklick Creek watershed, if agreements can be obtained with other political jurisdictions and other sewer service providers or through annexation. Wastewater from areas on the north and west sides of Columbus, areas outside of I-270, Grove City and excess flows from the Jackson Pike WWTP are also treated at the Southerly WWTP.

Columbus has agreements with several entities including New Albany, Reynoldsburg, Gahanna, Brice, Groveport and a portion of Delaware County to provide wastewater treatment service for the next 20 years.

4.01.03 City of Columbus Collection System

The sewerage collection system for the city of Columbus consists of mainly separately sewered areas. Columbus, however, also has areas served by combined sewers. Additional description is provided below and in the biological and water quality survey of the middle Scioto River and Alum Creek (Ohio EPA 1999).

In separately sewered areas, wastewater is conveyed to the wastewater treatment plant through sanitary sewers while storm water is conveyed to area streams through storm sewers. In combined sewer areas, the wastewater and any storm water is directed to the wastewater treatment plant in one pipe. During some storm events, overflows of combined sewage and storm water (termed combined sewer overflows, or CSOs) are discharged from overflow structures in the collection system to local streams. Cities with CSOs are required to minimize overflows and protect water quality. U.S. EPA and Ohio EPA are currently reviewing a Long Term Control Plan developed by Columbus to meet the regulatory requirements for CSOs.

Sanitary Sewer Overflows

Sanitary Sewer Overflows (SSOs) are untreated sewage overflows from separately sewered areas. Discharges from SSOs are not authorized under the Clean Water Act. Columbus SSO locations are throughout its sanitary sewer collection system with 80% located in the older portions. These SSOs discharge directly to a storm sewer when infiltration and inflow from rain events surcharge the sanitary sewers. The sanitary sewer collection system has over 100 un-permitted sanitary sewer discharge points, which ultimately discharge to the Scioto River, Olentangy River and Alum Creek by way of storm sewers and ditches. The frequency of these discharges is unknown. A list of SSOs including the relief location, type of discharge and discharge location are provided in Appendix 10. The Columbus Sewer Maintenance Operations Center continues to investigate all suspected sanitary sewer relief locations. Ohio EPA and the City of Columbus have reached agreement on a comprehensive resolution to the SSO issues within the Columbus system. The agreement is set forth in a Consent Order which was public noticed for comment prior to being issued by the Franklin County Court of Common Pleas on August 1, 2002.

Bypasses and Wet Weather Overflow Tanks

Both the Columbus Southerly and Jackson Pike facilities have treatment bypass structures at the head of the treatment plant. These bypass structures provide no treatment, but prevent hydraulic overloading of the treatment facility or collection system during rainfall events. Hydraulic overloading may cause operational problems, reduce treatment efficiency or backups in the collection system (e.g., basement flooding). These structures are permitted outfalls in the NPDES permits with monitoring requirements so that the frequency and duration of sewage treatment bypassing is recorded. Obviously bypasses

are not desirable and sewer system and treatment plant capacity should be designed to minimize their occurrence. Recent examinations of monthly operating report data from each plant indicates that bypass outfalls at the Jackson Pike treatment facility are rarely used, but there has been an unacceptable pattern of routine discharges from the Columbus Southerly 002 bypass outfall. The Consent Order requires the City of Columbus to build the necessary infrastructure improvements to correct this problem.

There are presently two wet weather overflow structures in the Columbus sewer system that provide some degree of storage and treatment of wet weather flows. They are the Alum Creek Storm Tank Overflow (Columbus Southerly permit outfall 006) and the Whittier Street Storm Tank Overflow (Jackson Pike WWTP permit outfall 018). There is also a monitored bypass at the Whittier Street structure (Jackson Pike WWTP permit outfall 019). Previous studies found by volume that the Whittier Street Storm Tank accounts for 90% of all CSO releases and that the Alum Creek Storm Tank ranks second with 7% (Ohio EPA 1986). These structures were designed in the 1930s to capture large amounts of pollutants in order to improve local surface water quality. The tanks act as temporary holding basins during small storm events, holding sewage until the levels in the interceptor sewers subside, or providing primary treatment prior to discharge when large storm events occur. Solids are retained in the tank and then returned to the WWTPs for treatment. The Consent Order requires the City of Columbus to build the necessary infrastructure improvements to improve the headworks of the Southerly facility as well as the interconnector sewer to ensure that high flows can be taken into the plant, and a tunnel that will provide storage capacity for additional flows.

Combined Sewer Overflows

There are a total of 34 permitted regulator discharges, relief structure overflows and storm tank overflows in the Columbus collection system that are CSOs. The main storm water tanks described in the previous paragraph and the other overflow points are listed in Appendix 10.

4.01.04 Village of Canal Winchester

The Village of Canal Winchester owns and operates a 2.48 mgd wastewater treatment plant (WWTP). The facility is located at 410 Ashbrook Road in southeast Franklin County. The WWTP discharges to Walnut Creek at RM 24.20. The Village provides services to a rapidly growing community of about 3400 residents along with the Village of Lithopolis. The original WWTP was constructed around 1960 and was designed to handle an average flow of 0.33 mgd. The treatment system was upgraded and expanded in 1987 and in 1992. In 1996 and 1997 Ohio EPA issued permits to the Village allowing for expansion of the WWTP to meet Best Available Demonstrated Control Technology (BADCT) limitations. The expansion consisted of replacing the existing plant with a new treatment system and converting the old plant into sludge handling facilities. The NPDES permit expired on February 26, 2002 and is scheduled to be renewed in 2003.

4.01.05 City of Pickerington

The City of Pickerington owns and operates an advanced WWTP, which discharges to Sycamore Creek. Wastewater flows have recently increased from an average daily flow of 1.5 MGD to 1.9 MGD. A permit modification request was submitted to Ohio EPA on September 12, 2000 to treat 3.5 mgd at the plant.

The facility received an NPDES permit from Ohio EPA on November 27, 1996 with an effective date of November 1, 1996. The permit expired on October 28, 2001. A public hearing was held on January 10, 2002 to consider the city's newest request to treat and discharge up to 3.5 mgd. The Agency has determined that this proposal would meet water quality standards for Sycamore Creek and does not conflict with the existing 208 Plan. A draft NPDES permit renewal that incorporates this increase was public noticed in April 2002. A public hearing on the draft permit was held on August 29, 2002. A final permit is expected to be issued shortly.

4.01.06 Village of Carroll

The Village of Carroll owns a wastewater treatment works located on the east side of U.S. Route 33, just north of Winchester Road, Bloom Township, Fairfield County. The Village has contracted with the Fairfield County Utilities Department for the operation of the treatment and collection system. Service is provided to approximately 700 residents and small commercial entities within the Village limits. The facility is a two cell controlled discharge lagoon system designed to treat an average design flow of 0.038 MGD. The discharge point is to an unnamed tributary to Walnut Creek. The draft NPDES permit renewal was public noticed on April 19, 2002.

4.02 Description of Existing County and Regional Sewer Districts

4.02.01 Fairfield County, Tussing Road Water Reclamation Facility

The Tussing Road Water Reclamation Facility (WRF) is owned and operated by the Fairfield County Commissioners. The facility is located at 10955 Tussing Road in Violet Township, Fairfield County, Ohio. The discharge point is to Blacklick Creek at river mile 11.15. The Tussing Road WRF was originally constructed in 1976 as a semi-public facility with an average design flow capacity of 0.22 mgd. The plant was purchased by Fairfield County in 1987 and was upgraded in 1988 to an average daily flow capacity of 1.0 mgd. The county again upgraded the plant in 1991 to increase the capacity to 1.4 mgd and in 1994, Ohio EPA PTI approval was given for a 2.0 mgd plant expansion. In addition to the normal influent wastewater flows and loads, the county collects solids from several package treatment plants located outside the Tussing Road WRF service area. The service area encompasses approximately 6,490 acres in Violet Township, along with a small area of Pickerington.

The Tussing Road WRF is designed to treat an average daily design flow of 2.0 mgd. The current permit expires March 31, 2003. Fairfield County Board of Commissioners

submitted an NPDES permit modification request on May 7, 2001. The permit modification requests to upgrade the plant in several phases to 3.0 mgd to serve their customers through 2010. The NPDES permit will be processed upon receipt of a permit to install application for the wastewater treatment plant upgrade. The permit to install application was received on April 15, 2002 and is under review. A revised permit is expected in 2003. The plant has been designed for future expansion up to 5.0 MGD to serve customers through 2020.

4.02.02 Fairfield County, Little Walnut Creek Water Reclamation Facility

The Little Walnut Creek Water Reclamation Facility (WRF) is owned and operated by the Fairfield County Commissioners. This advanced treatment works is located west of the intersection of Amanda Northern Road and Benadum Road in Violet Township, Fairfield County and discharges to Walnut Creek. The WWTP is designed to treat an average design flow of 0.75 mgd from residential, commercial and industrial waste. The NPDES permit renewal was issued on March 1, 2002. The WWTP has been designed for future expansion in 0.75 MGD increments up to 3.0 MGD to serve residences and businesses along the U.S. Route 33 corridor through 2020.

4.02.03 Fairfield County, Huntington Hills Water Reclamation Facility

The Huntington Hills Water Reclamation Facility is owned and operated by the Fairfield County Commissioners. A new facility has been proposed to be located along Stemen Road, just west of Saylor Road in Violet Township, Fairfield County. The proposed facility is designed to treat an average design flow of 0.80 mgd. This advanced treatment works would discharge to Sycamore Creek, tributary to Walnut Creek. The NPDES permit for the increased flow was issued on March 1, 2002. The Ohio EPA issued the PTI for this new facility (i.e., Sycamore Creek Water Reclamation Facility) on November 29, 2001. Upon completion of construction of the new facility the existing Huntington Hills plant will be demolished.

4.02.04 Franklin County, Century Acres

The Franklin County Commissioners own and operate the Century Acres WWTP, which is located at the east end of Greengate Drive in Madison Township, Franklin County. The facility is permitted to discharge 0.025 mgd directly to Big Run at RM 1.75, tributary to Walnut Creek. The NPDES permit for Century Acres expires on June 30, 2005.

4.02.05 Franklin County, Oakhurst Knolls

The Franklin County Commissioners own and operate the Oakhurst Knolls WWTP, which is located on the east side of Norton Road in Pleasant Township, Franklin County. The facility is permitted to discharge 0.1 MGD directly to Hellbranch Run at RM 5.8. The NPDES permit for Oakhurst Knolls expires on June 30, 2005.

4.02.06 Franklin County, Holton Park Estates

The Franklin County Commissioners own and operate the Holton Park Estates WWTP, which is located at the south end of Grove City at 1500 Holton Road in Jackson Township, Franklin County. The facility is permitted to discharge 0.005 mgd to an unnamed tributary of Grant Run. The Holton Park Estates WWTP is not under NPDES permit. Franklin County is in the process of submitting an application.

4.02.07 Franklin County, Taylor Estates

The Franklin County Commissioners own and operate the Taylor Estates WWTP, which is located at 5940 Alice Drive., Plain Township, Franklin County. The facility is permitted to discharge a monthly average flow of 0.025 mgd to an unnamed stream, tributary to Rocky Fork Creek and Big Walnut Creek. The NPDES permit for Taylor Estates expires on March 31, 2005.

4.02.08 Franklin County, Darbydale - a proposed facility

Malfunctioning onsite disposal systems and home aerators have been discharging raw and partially treated sewage to storm sewers and roadside ditches in the unincorporated community of Darbydale in Pleasant Township, Franklin County. While this community is within the Columbus FPA, it lies outside the area where service is expected to be provided by the City of Columbus within the next 20 years, and a proposed Darbydale facility service area has been established. (See Appendix 1, Fig. 9)

Directors Final Findings and Orders (DFFOs) were issued February 4, 2002 to the Franklin County Commissioners to correct the pollution problems. A 0.5 MGD advanced wastewater treatment plant (WWTP) that would discharge to an unnamed tributary of Big Darby Creek has been proposed by Franklin County. This WWTP is also expected to serve the three nearby mobile home communities and a school (described below). However, the City of Columbus may determine that it is technically and financially viable to construct the necessary trunk sewers and take the flow that is currently planned to be directed to the new Darbydale WWTP. As it stands now, the applications for NPDES and PTI permits (received by Ohio EPA on August 9, 2002) were returned to the County in October, along with a comment letter, due to incomplete information.

The Timberlake subdivision community (see Section 4.03.04) is under separate DFFOs and future agreements or DFFOS may require treatment at the new Darbydale facility or by the City of Columbus. To allow for either possibility, the Timberlake subdivision is an overlapping service area (Darbydale and City of Columbus).

Community Gardens MHP

This manufactured housing park is located at 6244 State Route 665, Pleasant Township, Franklin County and is served by a 0.03 mgd wastewater treatment plant. It currently receives the effluent from this development and Pleasant Acres MHP. It will be abandoned when connection to the Darbydale WWTP is accomplished in 2005. The new Darbydale

WWTP will be built on this property and discharge to the unnamed stream, tributary to Big Darby Creek.

Pleasant Acres MHP

This manufactured housing community is located at 6106 State Route 665, Pleasant Township, Franklin County and is served by a 0.03 mgd wastewater treatment plant. It will be abandoned when connection to the Darbydale WWTP is accomplished in 2005.

Oak Hills MHP

This manufactured housing community is located at 5965 Harrisburg-Georgesville Road, Pleasant Township, Franklin County and is served by a 0.069 mgd wastewater treatment plant with a discharge to Big Darby Creek. This treatment facility consistently violates its NPDES discharge permit. The discharge permit will be modified before 2005 to require connection to the Darbydale WWTP.

Darbydale Elementary School

A 7,500 gpd treatment works serving this South Western City School District facility is located at 7000 State Route 665, Pleasant Township, Franklin County. This permit will be modified by 2005 to require connection to the Darbydale WWTP.

4.02.09 Pickaway County - Scioto and Darby Townships

This area is directly adjacent to Franklin County and the proposed Columbus Metropolitan Facility Planning Area (*Columbus Metropolitan Facility Plan Update (CMFP)*, Malcolm Pirnie 2000). Portions of these townships near the villages of Harrisburg and Orient are within the existing Columbus FPA. Based on population density forecasts the *CMFP* update does not call for providing centralized sewers in the southwest corner of Franklin county (portions of Pleasant Township). However, there is a concentration of failing individual home sewage treatment and disposal systems (HSTDS) in the Village of Harrisburg which straddles the Franklin/Pickaway County line. The feasibility of wastewater service to this community should be evaluated in the planning described below.

Pickaway County drains into the Scioto Basin, with many of the incorporated communities operating their own municipal wastewater treatment systems. The Board of County Commissioners has the responsibility pursuant to Chapter 6117 of the Ohio Revised Code (ORC) to review and approve sanitary sewerage facilities in the county outside of any municipal corporation. The Board also has the authority to establish sanitary sewer districts and construct sanitary sewerage facilities for the purposes of preserving and promoting the public health and welfare.

The Pickaway County Commissioners hired MS Consultants to compile a planning document, entitled "Wastewater Treatment Study of Scioto and Darby Townships," dated July 28, 2000, with an addendum dated August 10, 2000. An additional study was compiled on April 4, 2001, specific to Darby Township improvements. The studies were initiated because of 1) water quality degradation in the Big Darby watershed as a result of discharges from several existing WWTPs in the planning area, 2) localized pollution

problems from failing on-site wastewater systems, 3) poor siting of HSTDS due to lot size, poor soil conditions, high ground water, etc. and 4) residential and commercial development being constrained due to the lack of public sewerage facilities.

The initial study identified wastewater treatment planning options for Darby and Scioto townships. The addendum recommended wastewater treatment options for Harrison Township based upon a recently-completed land use study for the township. Communities not covered by the study which own and operate their own regional WWTPs, in other portions of the county include Ashville, Circleville, South Bloomfield, Williamsport and New Holland. Unsewered communities include Darbyville and Tarlton. Other areas in the county are served by individual package plants or on-site HSTDS.

The study evaluated many alternatives for wastewater treatment and based upon public input, recommended two regional WWTPs. The existing Ohio Department of Rehabilitation and Correction Wastewater Treatment Facility in Orient will be expanded in phases, to serve existing and future development in Darby Township, Orient and the unsewered Village of Harrisburg. Design is expected to begin on these projects soon. The feasibility of a second plant near Commercial Point, to serve the remainder of Scioto Township is being evaluated. A schedule has not been developed for the Scioto Township improvements. Both plants would serve areas with failing on-site septic systems and eliminate smaller package plants.

4.02.10 Jefferson Water and Sewer District - Wengert Road WWTP

The Jefferson Water and Sewer District (JWSD) owns and operates the Wengert Road WWTP, located on the south side of Wengert Road, Jefferson Township, Franklin County. The WWTP services various developments within the unincorporated areas of Jefferson Township. The facility discharges treated wastewater to an unnamed tributary to Blacklick Creek at RM 18.10.

Ohio EPA issued a permit to install in December 1988 for the 0.180 mgd extended aeration WWTP. The facility received an NPDES permit on June 13, 1995 which expired on June 27, 2000. Timely application has been made for a permit renewal.

Ohio EPA was notified on August 20, 2002 (letter from Theodore Boggs to Joseph Koncelik) that the JWSD and the City of Columbus entered into a long-term agreement for the treatment services for wastewater generated in the District's sanitary sewer area. Under the agreement, the District will continue to own, operate and maintain the collection sewers within this sanitary sewer area. Connection to the Blacklick Creek subtrunk sewer and routing of sewage to the City of Columbus is anticipated to occur within the next six to twelve months. The District's Wengert Road Plant and Windrush Plant (see next section) will continue to operate until this connection is completed.

4.02.11 Jefferson Water and Sewer District - Windrush Creek Subdivision

The JWSD owns and operates the Windrush Creek wastewater treatment plant (WWTP). The WWTP is located on the south side of Windrush Lane, east of Taylor Station Road, Jefferson Township, Franklin County. The facility discharges to an unnamed stream, tributary to Rock Fork Creek and Big Walnut Creek. The facility was constructed in 1974 to provide wastewater service to 78 homes. The WWTP is a 0.040 mgd advanced treatment system. The 1997 renewal NPDES permit required that the Windrush Creek WWTP be abandoned and the wastewater be directed to the Wengert Road sewerage system. See Section 4.02.10 for an explanation of when the Windrush Creek plant will cease operation.

4.02.12 Southwest Licking Community Water and Sewer District

The Southwest Licking Community Water and Sewer District (SLCWSD) maintains its own wastewater treatment plant (WWTP) at the corner of Refugee and Gale Roads, Harrison Township, Licking County. The plant discharges treated wastewater to the South Fork of the Licking River and is currently permitted for an average daily flow of 1.0 mgd. The facility received an NPDES permit on January 18, 1994 with an effective date of March 1, 1994. The permit expired on February 28, 1999. The plant continues to operate under this permit, while a permit renewal application is under review pending completion of project planning by SLCWSD. In June 2002 Ohio EPA approved a PTI for a design flow of 2.65 MGD that is expected to serve customers through 2010. A future plant expansion to treat between 4.0 - 4.8 MGD will be needed to serve the estimated growth within the District by 2020.

The service area is generally bounded by Morse Road in Licking County to the north, Dixon Road to the west, Palmer Road to the south and Gale Road to the east.

4.02.13 Union County - Heritage Industrial Park

The Heritage Industrial Park, located off Industrial Parkway in the southeast corner of Jerome Township, Union County, is comprised of a mixture of light industrial and commercial facilities. The industrial park was originally constructed in 1989. Wastewater generated at the park was formerly treated through an 8,000 gpd wastewater treatment plant that discharged to the North Fork of Indian Run. The package plant, which was owned and operated by the Union County Commissioners, was abandoned in 1998 following construction of a force main/gravity sewer collection system along Industrial Parkway to convey the wastewater to Marysville for treatment.

4.02.14 Union County - Jerome Industrial Park

The Jerome Industrial Park, located off Industrial Parkway in the southeast corner of Jerome Township, is comprised of a mixture of light industrial and commercial facilities. The industrial park was originally constructed in 1976. Wastewater generated at the park was formerly treated through a 20,000 gpd wastewater treatment plant that discharged to the Gordon Tri-County Ditch. This facility was owned and operated by the Union County

Commissioners and then abandoned in 1998 following construction of a force main/gravity sewer along Industrial Parkway to convey the wastewater to Marysville for treatment.

4.03 Description of Privately Owned Utilities

4.03.01 Ohio-American Water Company - Blacklick Estates WWTP

The Blacklick Estates Wastewater Treatment Plant (WWTP) is owned and operated by the American Water Works Company. The facility is located at 4010 Signal Road, Madison Township, Franklin County, Ohio.

In September 1994, Ohio EPA issued a permit-to-install (PTI) for major improvements to the Blacklick Estates WWTP. The facility received a National Pollutant Discharge Elimination System (NPDES) permit from Ohio EPA on June 27, 2000, with an effective date of August 1, 2000. The permit expires April 1, 2003. Final effluent is discharged directly to Blacklick Creek at RM 4.85.

The plant serves the Blacklick Estates subdivision, with 3,100 residential connections and has the capability to treat 1.2 million gallons per day (mgd) of wastewater.

4.03.02 Ohio-American Water Company - Huber Ridge Subdivision

The wastewater treatment plant (WWTP) at the Huber Ridge Subdivision was constructed in 1962 then upgraded with additional treatment capacity and modernized equipment in 1994. The facility utilizes a lift station, comminutor, extended aeration, clarification, flow metering, chlorination and dechlorination. In addition, sludge-holding and aerobic digestion are operational and equipped with a belt filter press to dewater sludge. The plant has an average design flow of 1.03 mgd and discharges into Alum Creek. A renewal NPDES permit was issued to the Huber Ridge WWTP on June 29, 2001 with an effective date of August 1, 2002 and an expiration date of July 31, 2006.

4.03.03 Ohio-American Water Company - Lake Darby Estates WWTP

The Lake Darby Estates WWTP is owned and operated by the American Water Works Company. The plant is located at 491 Hubbard Road, in Prairie Township, Franklin County. The plant is a 0.50 mgd extended aeration treatment system that includes tertiary pressure filters. The discharge is to Big Darby Creek. The NPDES permit expires on February 28, 2005.

4.03.04 Cordell Regional Utilities, Timberlake Subdivision

A 50,000 gpd wastewater treatment plant serves this residential development and is located at 6675 Lambert Road, Pleasant Township, Franklin County. It discharges to Hellbranch Run, tributary to Big Darby Creek. Directors Final Findings and Orders issued by the Director of Ohio EPA in May 2002 require Cordell to construct new sewage collection system components (equalization basin, force main and metered pump/lift

station), to abandon the treatment system and eliminate the discharge to Hellbranch Run. Within three years the sewers will be connected to a centralized sewer system.

While this subdivision is within the Columbus FPA, it lies outside the area where service is expected to be provided by the City of Columbus within the next 20 years (See Appendix 1, Fig. 9). Central sewer service can be provided by the City of Columbus or, as summarized in the DFFOs and a Public Utilities Commission of Ohio report of investigation, the proposed Franklin County Darbydale facility (see Section 4.02.08) is another viable option. To allow for this possibility, the Timberlake subdivision is an overlapping service area (Darbydale and City of Columbus).

4.04 Description of Industrial Wastewater Sources - Blacklick Creek

4.04.01 Columbus Steel Drum

Columbus Steel Drum is located at 1385 Blatt Boulevard in Gahanna, Franklin County. This facility reconditions and recycles 55-gallon steel drums. The industrial processes include heat oxidation, stripping, caustic washing, shot blasting and painting. All process wastewater is discharged to the Gahanna sanitary sewer system with treatment provided by Columbus. The NPDES permit for this facility is for the runoff discharged to an unnamed stream, tributary to Blacklick Creek at RM 17.8.

The facility received an NPDES permit from Ohio EPA on May 10, 2001 with an effective date of June 1, 2001. The permit expires May 31, 2006. In 2002, three separate referrals have been sent to the Attorney General's Office to address multiple violations at the facility.

4.04.02 AEP Cooling Water

American Electric Power owns an operations and control center at 4500 South Hamilton Road in Groveport, Franklin County. The primary function of this facility is to monitor the generation, transmission and distribution of electricity. The facility uses well water to cool units in the operations center. The non-contact cooling water is then discharged to a 4 million gallon retention pond, where it is mixed with storm water collected at the facility then discharged to Blacklick Creek. The facility does not discharge water to Blacklick Creek continuously, but is able to discharge up to 0.576 mgd.

The facility received an NPDES permit on May 24, 2000 with an effective date of July 1, 2000. The permit expires June 30, 2005.

4.05 Description of Other Wastewater Sources - Blacklick Creek

Several small WWTPs are operating in the Blacklick Creek watershed without permits. The following discussion describes those sources and their status.

4.05.01 Winding Hollow Country Club - Land Application System

The Winding Hollow Country Club, located at 6140 Babbit Road, New Albany, operates a sewage treatment plant with a spray irrigation system that serves the clubhouse facilities. Treated wastewater is land applied to golf course grounds and is not discharged to surface waters. Because the system is a non-discharging facility, an NPDES permit has not been issued as of this point in time.

4.05.02 Modern Mobile Home Park

Modern Mobile Home Park, located at 8910 East Main Street, Etna Township, Licking County, has a sewage treatment facility consisting of a 3,600 gallons per day (gpd) extended aeration treatment plant. This facility is preceded by a trash trap and followed by dosing, surface sand filters and a chlorine contact tank. The plant discharges to an unnamed stream, tributary to Blacklick Creek and has the capability to serve twenty-six (26) mobile homes. The facility received a PTI on July 17, 1987.

An NPDES permit application was received in November 2000 and is still pending. Additional information was requested in April 2001 pertaining to alternatives for the plant and Ohio EPA is awaiting a response from the applicant.

4.05.03 By-Willow Mobile Home Park

By-Willow Mobile Home Park (formerly known as the Main Mobile Home Park and Willison Trailer Park), located on 10 acres at 8450 East Main Street in Etna Township, Licking County, currently operates a sewage treatment plant. It consists of an extended aeration unit (aeration and clarification) followed by surface sand filters and discharges to an unnamed stream, tributary to Blacklick Creek. The plant serves twenty-two (22) mobile homes. Plans for the plant were originally approved by Ohio EPA in 1978 for a 3,850 gpd plant, serving 17 trailer spaces, a one-bedroom apartment and 10 employees. The NPDES permit requires the WWTP to be abandoned and tied into the Southwest Licking Community Water and Sewer District no later than February 2004.

4.05.04 Previously Unidentified Point Source

The “stream walker” (see Appendix 9) identified a discharge pipe in Licking County, two miles from the Blacklick Creek headwaters. The pipe was discharging a reddish-brown substance, which was affecting 8-10 miles of Blacklick Creek downstream from its discharge point. Ohio EPA has visually inspected the discharge point 4 times since the discharge was noted and no evidence of discharge has been found since the initial occurrence. If a discharge is noted, sampling will be done to determine the source and action will then be taken to ensure the source is in compliance with federal and state regulations.

4.06 Home Sewage Treatment and Disposal, County Health Department Programs

The following is a summary of how counties regulate home sewage treatment and disposal systems (HSTDS).

4.06.01 Licking County

For subdivisions, the Licking County Health Department permits septic systems with leach fields on a minimum lot size of 1.6 acres; however, this size may not be adequate depending upon the soil type present. The health department also permits septic systems for individual lots that are 1 acre, exclusive of easements and right-of-way, under ideal soil conditions.

4.06.02 Fairfield County

Under the Fairfield County Subdivision Regulations, a minimum lot size of 1 acre (43,560 sq. ft.) is required to install a HSTDS; however, with certain soil types, the county would not permit a HSTDS if the soil was not compatible with such a treatment system. Most areas within Fairfield County located within the Blacklick Creek watershed are either served by Fairfield County or Pickerington. The unsewered areas remaining in Violet Township are zoned residential with a minimum lot size requirement of 20,000 square feet for an R1-Residential zoning and 30,000 square feet for an R2-Residential zoning, not including streets and miscellaneous easement areas.

4.06.03 Franklin County

The Franklin County Health Department's HSTDS program incorporates the use of alternative technology under the guidance of the Ohio Department of Health. Off-lot discharging systems are prohibited in proposed subdivisions. Installation of systems on hydric soils such as Pewamo or Kokomo is not allowed. A minimum individual lot size of 40,000 square feet under ideal soil conditions is required to install a HSTDS. The lot size may be required to be larger depending upon the soil type. The county encourages a minimum subdivision lot size of 2 acres (87,120 sq. ft.) where use of on-site treatment systems is planned. The Health Department has identified a number of areas in the Blacklick Creek watershed that have failing septic systems

4.06.04 Delaware County

The Delaware County Health Department requires a minimum lot size of 1 acre, exclusive of easements and right-of-way where use of on-site treatment systems is planned. Depth to ground water or rock strata must be at least 4 feet below the bottom of the proposed system. On-lot sewage disposal systems are not permitted in severe soil conditions (as identified by the county Soil Survey). In addition, texture, structure and permeability of the soil must be suitable to provide internal drainage.

4.07 On-lot HSTDS in the Blacklick Creek Watershed

Several portions of the watershed, particularly those in the uppermost and lower reaches as well as areas within the eastern boundaries, are not presently served by any centralized collection system (described herein as "undeveloped"). For the northeastern portion of the watershed, Licking County is responsible for addressing wastewater treatment issues. For

the uppermost portion of the watershed west of Licking County (except for a very small area in Delaware County) and the undeveloped lower watershed, Franklin County is the responsible entity.

The use of “home aeration units” with off-lot discharge to treat sewage from individual homes has been found to be rather extensive within the Blacklick Creek basin. There are approximately 75 aerators in Plain Township, 19 aerators in New Albany, 147 aerators in Jefferson Township, 68 aerators in Reynoldsburg, 12 aerators in Truro Township, 7 aerators in Brice, 48 aerators in Madison Township, 2 aerators in Columbus and approximately 350 aerators in Licking County.

Closely spaced home aerators or home aerator discharges to a common collector tile have been found to be the cause of nuisance conditions and water quality standards violations in many areas of Ohio.

In general, the older the aeration system, the more likely that it does not produce a good quality effluent. Newer model aeration units may provide better treatment, especially if devices for filtration and disinfection have been provided. Even with these additional controls, they may still not meet water quality standards. Franklin County has a program to inspect home aerators annually. Licking County inspects these systems on a complaint-basis.

The 1996 Blacklick Creek TSD lists home aerators as a contributing factor for non-attainment of water quality standards in the upper Blacklick Creek basin.

4.08 Population Projections and Future Treatment Needs

4.08.01 Columbus Metropolitan Area

The 2000 census figures for Franklin County and Columbus are 1,068,978 and 711,470, respectively. No precise figure is available, but this range of population approximates the population presently served by centralized sewer systems in the Columbus Facility Planning Area. The *CMFP* update included a map of the areas expected to have population densities of two or more people per acre by the year 2020 based on forecasts supplied by MORPC (see Appendix 1, Fig. 2, denoted as “served, contracted and 20 year growth areas”). No equivalent future population figure was provided. The *CMFP* states that the City of Columbus will be able to meet this anticipated need with the existing wastewater treatment capacity at its two plants. However, some major collection system improvements are necessary to address an unacceptable pattern of plant bypasses at the Columbus Southerly facility and SSOs. See Section 4.01.03 for more discussion about the Columbus collection system. As described in more specific terms in Section 5.02, the treatment needs in some areas of the Facility Planning Area can also be met by other providers.

As summarized in Section 3 and covered in more detail in a report entitled *Biological and Water Quality Study of the Middle Scioto River and Alum Creek* (Ohio EPA 1999), there have been improvements to the sewage collection system that have reduced wet weather

overflows and the impacts on receiving waters. However, sewer system capacity at dry weather vs. wet weather conditions will continue to be a concern in light of the added sanitary flows associated with the anticipated growth. Refer to additional discussion in Section 4.01.03.

The MORPC *2025 Transportation Plan* (2001) contains recent population projections for local communities in Franklin County, Delaware County and portions of Licking and Fairfield counties (Appendix 11). This data shows that Columbus and many suburban communities should expect substantial growth in the next two decades. The total population growth of the MORPC study area by 2025 was estimated at 419,000. If the growth in communities outside of the Columbus Metropolitan Facility Planning Area is subtracted, a rough estimate of an additional 300,000 people in the Columbus FPA by the year 2025 is obtained. The majority of this population will need centralized sewer service.

The *Columbus Comprehensive Plan* (1993) contains this description of how the necessary infrastructure needs will be programmed and implemented.

“Sanitary sewer service will be programmed for Expansion Development Districts (or sub-districts) at such time as a plan for an appropriate level of capital improvements and service provision is in place. The service plan will include a full description of capital improvements and services needed to appropriately serve the area or any part or parts thereof, a timetable for implementing them, a budget and identification of a dependable source of financing. The capital improvements and services can be financed by the city, private interests, or a combination. Programming of sanitary sewer service to an expansion development district will represent an acknowledgment by the city of Columbus that a satisfactory level of facilities and services will be available. Such acknowledgment will require the passage of a specific Plan recommendation ordinance by City Council, taking into account the recommendations of the Development Department.”

The City of Columbus Planning Division maintains a web page that provides many of the planning documents for the city’s expansion districts (<http://www.columbusinfobase.org/>). This site also includes information on the city’s six-year Capital Improvements Program (CIP). The CIP is intended to provide a general framework for the city’s capital investment. This database, which includes maps and project information by planning area, supplies information about capital improvement projects for water and sewers.

4.08.02 Blacklick Creek Watershed

Typical of the greater Columbus metropolitan area, growth and development has been proceeding rapidly in the Blacklick Creek watershed in recent years. While a number of areas within the watershed remain undeveloped, only the northeastern quadrant in Licking County (i.e., portions of Monroe Township) and the southeastern tip of Harlem Township (Delaware County) in the Blacklick basin are expected to remain rural. Based on MORPC projections (see Appendix 1, Figs. 6 and 7) the rest is expected to continue developing, though a few locations, most notably in southeast Columbus and the Jefferson Township

portion of Franklin County, are proposed for “cluster development,” which would also include large tracts of undeveloped “green space.” With this continued growth, as well as some water pollution problems attributable to inadequate and/or failing HSTDS, future sewer service will likely be needed in many currently undeveloped areas of the Blacklick watershed.

Based on MORPC projections by traffic zone of population growth and percent change in housing units between 2000 and 2020, both population and housing increases are projected throughout the watershed. However, the greatest increases are projected to occur in these portions of the watershed: 1) New Albany and surrounding unincorporated areas; 2) east of Gahanna in both unincorporated areas and areas within Columbus; 3) in Reynoldsburg and; 4) in Groveport, adjacent southeast Columbus and surrounding unincorporated areas. Please refer to Appendix 1, Figs. 7 and 8.

Central sewer service can be provided to most of the anticipated future development areas within the watershed simply by extending collection systems from existing sewer lines. In some instances, however, major new trunk sewer lines may be needed, such as those proposed to augment the existing, undersized City of Columbus’ Blacklick Trunk Sewer south of I-70 and to extend the Blacklick Trunk Sewer north from the Broad Street area to serve the future needs of New Albany, Plain Township and possibly Jefferson Township. The Blacklick Trunk Sewer has also been designed to transport the flows from existing WWTPs within the watershed, namely the Jefferson Water and Sewer District’s Wengert Road plant, Fairfield County’s Tussing Road WRF and, potentially, the Blacklick Estates WWTP - if these treatment facilities are abandoned - to Columbus’ Southerly WWTP. However, mutually satisfactory service agreements must be reached between Columbus and these other providers.

While many undeveloped areas within the watershed have only one sewer system to which they can feasibly connect, a few locations could be served by more than one existing system. These include much of Jefferson Township, which could be served by either the Jefferson Water and Sewer District or the City of Columbus (via sewers from Gahanna, Reynoldsburg, or Columbus) and the southwestern corner of Licking County, which could be served by either the Southwest Licking Community Water and Sewer District or the City of Columbus (via sewers from Reynoldsburg or Columbus). While Ohio EPA is aware of cluster HSTDS in the Blacklick Creek watershed, information is not available as to whether these systems are currently failing.

4.09 Protecting Water Quality in Blacklick Creek

As indicated in the earlier section of the report on existing water quality, growth and development within the watershed are seriously threatening and also causing degradation of, water quality in Blacklick Creek and its tributaries. Research from a number of streams in Ohio similar to Blacklick Creek suggests that a value between 40 - 60% urban land use represents an upper value beyond which it is highly unlikely that the Warmwater Habitat water quality standards can be maintained (Yoder, et. al., 2000). This is largely due to habitat alteration (i.e., physical changes to the stream and its tributaries, such as

channelization, culverting, streambank disturbance, etc., as well as removal of streamside riparian vegetation) and to changes in storm water runoff (i.e., increased flow amounts and intensity, leading to severe scouring and siltation and decreased stream recharge during low-flow periods). Changes in storm water run-off are due to “hardening” of the watershed caused by increased impervious surfaces (parking lots, roofs and roads) and increased pollutant loading from flushing of paved surfaces and storm water catch basins. Finally, although agricultural land use is on the decline in the watershed the potential for negative impacts on water quality have been documented.

Therefore, proactive steps to protect water quality in Blacklick Creek and other rapidly developing watersheds, should be a part of the region’s water quality management plan. The potential for negative water quality impacts can be avoided or minimized if the proper Best Management Practices (BMPs) are planned, installed and maintained whenever land development occurs. Another factor to consider is that, according to the 1998 Technical Support Document referenced earlier in this report, the mainstem of Blacklick Creek is at or near its capacity for assimilating pollutants from wastewater treatment plant discharges. In order to discharge additional wastewater into the mainstem of Blacklick Creek, either additional pollution controls will be needed for existing discharges, or new discharges will need to meet more stringent effluent limits than is currently the case with existing wastewater treatment facilities. Lastly, the remaining farming operations in the watershed should receive any necessary technical assistance from local SWCD offices or the Ohio Department of Agriculture to ensure that proper BMPs are installed to reduce pollution and improve stream habitat conditions.

4.09.01 Headwater streams

The Blacklick Creek basin is comprised mainly of small headwater streams flowing directly into Blacklick Creek. There are approximately 14 headwater streams in the Blacklick basin and, of the seven that have been briefly investigated, at least six are of rather high quality and need special protection. Also, as mentioned under the description of existing water quality earlier in the report, headwater streams in the watershed are being threatened by development impacts to the extent that the loss of integrity of these streams will prevent the Blacklick Creek mainstem from fully attaining its water quality standards.

Ohio EPA is currently investigating means of further protecting these headwater streams. In the Ohio EPA fact sheet “Clean Rivers Spring from Their Source: The Importance & Management of Headwater Streams”, which focuses on streams in watersheds with less than a square mile of drainage area, it states that there is a wide range of activities that can result in the degradation of primary headwater streams. Smaller streams tend to be more susceptible to the direct effects of nonpoint sources of pollution than larger streams. This may be partly because primary headwater streams form the principal boundary between land and water resources. They collect water, sediment, energy, chemicals and other inputs from the surrounding land which then flow into larger streams. Hydro-modification (activities that result in habitat degradation such as channelization and riparian vegetation removal) is the leading source of impairment and is the origin of habitat degradation, nutrients and silt found in smaller streams and the larger streams into which they flow.

At this time, it appears that only two governmental entities - Licking County and Jefferson Township (Franklin County) - within the Blacklick Creek basin actually have regulations or land use policies providing some protection for these small headwater streams.

The easiest way to aid in protecting these headwater streams is to preserve their riparian buffer. This includes eliminating channelization or culverting of existing streams and ensuring stream flows are not diminished throughout the watershed.

Another factor which needs to be considered in planning future wastewater collection and treatment facilities in the watershed is the importance of maintaining an adequate hydrologic flow regime within the watershed. Blacklick Creek and its tributaries will lose ground water recharge as construction and development brings about an increase in impervious surfaces. The maintenance of stream flows through such means as direct wastewater discharges, ground water recharge via wastewater effluent spray irrigation systems and post construction BMPs at development sites that promote ground water infiltration of runoff should be evaluated.