

**TABLE 1. ASSESSMENT OF DESIGNATED AND DESIRED USES**

| <b>DESIGNATED USE</b>                                   | <b>STATUS/CAUSE</b>        |
|---|----------------------------|
| Agriculture   | No impact                  |
| Industrial water supply                                 | No impact                  |
| Public water supply                                     | No impact                  |
| Navigation  | No impact                  |
| <b>Coldwater Fishery</b>                                | <b>Impaired - sediment</b> |
| <b>Warmwater Fishery</b>                                | <b>Impaired - sediment</b> |
| <b>Other Indigenous aquatic life and wildlife</b>       | <b>Impaired - sediment</b> |
| Partial body contact recreation                         | No impact                  |
| Total body contact recreation (May 1 - October 31)      | No impact                  |
| <b>DESIRED USE</b>                                      | <b>STATUS</b>              |
| <b>Protect Stream Corridor From Further Degradation</b> | <b>Impaired</b>            |

TABLE 2. POLLUTANTS, SOURCES, AND CAUSES OF POLLUTION FOR THREATENED AND IMPAIRED DESIGNATED AND DESIRED USES

| IMPAIRED DESIGNATED USES                   | POLLUTANTS                  | Ranking                | SOURCES                                    | Ranking      | CAUSES   | Ranking  |   |
|--|-----------------------------|------------------------|--|--------------|--|--|---|
| Coldwater Fishery                          | Sediment                    | 1                      | Stream Banks                               | 1            | Stream bank erosion  | 1  |   |
|  |                             |                        | Road Runoff                                | 2            | Riparians landscaping down to creek's edge<br>Road grading practices                     | 2  |   |
|  |                             |                        | Culvert/Bridge Structures                  | 3            | Lack of detention/filtration within road right-of-way<br>Improperly installed structures | 1  |   |
|  | Temperature                 | 2                      | Impoundment Discharges                     |              |  | Erosion along side slopes and around structures lacking proper stabilization | 2 |
|  |                             |                        |  |              |  | Lack of shade producing vegetation around impoundments                       | 2 |
|  |                             |                        |  |              |  | Surface water discharges   | 1 |
|  |                             |                        |  |              |  | Stream bank erosion  | 2 |
|  | Stream Banks                | 1                      | Riparians landscaping down to creek's edge | Wind erosion | Riparians landscaping down to creek's edge   | 1  |   |
|  |                             |                        |  |              | Farming practices to rear the stream corridor  | 3  |   |
|  |                             |                        |  |              | Improperly stabilized drain tile outlets   | 2  |   |
| Warmwater Fishery                          | Sediment                    | 1                      | Agricultural Field Runoff                  | 3            | Farming practices to rear the stream corridor  | 1  |   |
|  |                             |                        | Culvert/Bridge Structures                  | 2            | Improperly installed structures  | 1  |   |
|  |                             |                        | Less than optimal functioning Floodplain   | 2            | Erosion along side slopes and around structures lacking proper stabilization             | 2  |   |
|  | Hydrology (causing erosion) | 2                      | Stormwater Runoff                          |              |  | Incised stream channel   | 2 |
|  |                             |                        |  |              |  | Altered stream morphology (e.g. channelization)                              | 1 |
|  |                             |                        |  |              |  | Unregulated discharges   | 4 |
|  |                             |                        |  |              |  | Poor stormwater management   | 3 |
|  | Temperature                 | 3                      | Impoundment Discharges                     |              |  | Channelization of stream; incised channel                                    | 1 |
|  |                             |                        |  |              |  | Stream morphology  | 2 |
|  |                             |                        |  |              |  | Stream bank erosion  | 1 |
| Other Indigenous Aquatic Life and Wildlife | Sediment                    | 1                      | Agricultural Field Runoff                  | 3            | Farming practices to rear the stream corridor  | 1  |   |
|  |                             |                        | Road Runoff                                | 4            | Improperly stabilized drain tile outlets   | 2  |   |
|  |                             |                        | Road grading practices                     | 1            |  |  |   |
|  | Hydrology (causing erosion) | 3                      | Stormwater Runoff                          |              |  | Lack of detention/filtration within road right-of-way                        | 2 |
|  |                             |                        |  |              |  | Stream morphology  | 1 |
|  |                             |                        |  |              |  | Improperly installed structures  | 1 |
|  |                             |                        |  |              |  | Erosion along side slopes and around structures lacking proper stabilization | 2 |
|  | Temperature                 | 2                      | Unshaded Stream Banks                      |              |  | Incised stream channel   | 2 |
|  |                             |                        |  |              |  | Altered stream morphology (e.g. channelization)                              | 1 |
|  |                             |                        |  |              |  | Unregulated discharges   | 4 |
| Altered Stream Morphology                  | 1                           | Impoundment Discharges |  |              | Poor stormwater management   | 3  |   |
|  |                             |                        |  |              | Channelization of stream; incised channel  | 1  |   |
|  |                             |                        |  |              | Stream morphology  | 2  |   |
|  |                             |                        |  |              | Channelization of stream; incised channel  | 1  |   |
| Temperature                                | 2                           | Unshaded Stream Banks  |  |              | Channelization of stream; incised channel  | 1  |   |
|  |                             |                        |  |              | Lack of shade producing vegetation along stream corridor                                 | 1  |   |
|  |                             |                        |  |              | Lack of shade producing vegetation along stream corridor                                 | 1  |   |
|  |                             |                        |  |              | Slow moving water  | 2  |   |

**TABLE 3. IMPAIRED DESIGNATED USES AND GOALS**

| <b>IMPAIRED DESIGNATED USES</b>                         | <b>GOALS</b>  |
|---|---|
| <b>Coldwater Fishery</b>                                | <b>Re-establish and Enhance Coldwater Fishery (upper reaches of the watershed)</b>  |
| <b>Warmwater Fishery</b>                                | <b>Re-establish and Enhance Warmwater Fishery (middle and lower reaches of the watershed)</b>                               |
| <b>Other Indigenous Aquatic Life and Wildlife</b>       | <b>Re-establish and Enhance Other Aquatic Life and Wildlife (specifically macroinvertebrates, small mammals, and birds)</b> |
| <b>DESIRED USES</b>                                     | <b>GOALS</b>  |
| <b>Protect Stream Corridor to Enhance Impaired Uses</b> | <b>Educate the public on the resource values of Kearsley Creek; Obtain easements from riparians</b>                         |

**TABLE 4. GOALS AND OBJECTIVES**

| <b>IMPAIRED DESIGNATED USES</b>            | <b>GOALS</b>   | <b>OBJECTIVES</b>   |
|--|--|---|
| Coldwater Fishery                          | Re-establish and Enhance Warmwater Fishery (upper reaches of the watershed)  | Reduce sediment inputs from stream bank erosion<br>Reestablish riparian zones and reduce temperatures<br>Decrease sediment inputs from gravel roads   |
| Warmwater Fishery                          | Re-establish and Enhance Warmwater Fishery (middle and lower reaches of the watershed)                               | Reduce sediment inputs from stream bank erosion<br>Reestablish riparian zones and reduce temperatures<br>Decrease sediment inputs from agricultural fields<br>Reduce erosion and sedimentation at bridges and culverts<br>Reduce sediment inputs from stream bank erosion<br>Reestablish riparian zones and reduce temperatures<br>Decrease sediment inputs from agricultural fields<br>Decrease sediment inputs from roads<br>Reduce erosion and sedimentation at bridges and culverts |
| Other Indigenous Aquatic Life and Wildlife | Re-establish and Enhance Other Aquatic Life and Wildlife (specifically macroinvertebrates, small mammals, and birds) | Reduce erosion and sedimentation at bridges and culverts  |
| <b>DESIRED USES</b>                        | <b>GOALS</b>   | <b>OBJECTIVES</b>   |
| Increase Flood Storage Within Floodplain   | For new construction, limit runoff to predevelopment rate  | Adopt stormwater ordinances<br>Create regional stormwater/wetland detention basins  |
| Protect Stream Corridor                    | Obtain vegetative easements within stream corridor   | Hold public information meetings and field workshops to educate the public on the resource values of Kearsley Creek and its surrounding land uses<br>Purchase land or obtain easements for areas identified as critical<br>Adopt ordinances to protect natural resources  |

**TABLE 5. OBJECTIVES BY SOURCE**

| OBJECTIVE BY SOURCE   | CAUSES  | TASKS  | TYPICAL SYSTEM OF BMPs *  | Milestones and # of sites to implement                          | TIMELINE                                 | AVERAGE COST PER SITE ***                       |         |
|---|---|--|---|---|--|---|---------|
| Reduce sediment from stream bank erosion  | Eroding stream banks at steep slopes, loose soils, lack of streambank vegetation, high flow areas, culvert inlets, and tributary confluence; in-stream obstructions | Stabilize eroding stream banks with vegetation, stone, logs and gabion baskets; armor tributary confluence; recontour bank slopes; remove obstructions to flow; install "look-alike" cross-vasces and rock riprap  | High priority sites: Revestment Structures, Taper Bank, Live Stake, Armour Channel, Blotunker, Anchor Logs, Gablion Bank, Armour Inlets, Cross-vasces, J-hooks    | 3   | Year 1                                   | \$2,000   |         |
|   |   |  | Soft structures (e.g. vegetative plantings)   | 9   | Year 1                                   | \$8,000   |         |
|   |   |  | Soft and Hard structures  | 17  | Year 1                                   | \$10,000  |         |
|   |   |  | Buffer strips   |   | Year 1                                   |   |         |
|   |   |  | Stormwater requirements   | Meet with three townships                                       | Year 1                                   |   |         |
|   |   |  | Wetland protection  | Meet with three townships                                       | Year 1                                   |   |         |
|   |   |  | Meetings with township, property owners and road commission   | Two township meetings   | Year 1                                   |   |         |
|   |   |  | Information and Education   |   |  |   |         |
|   |   |  | Moderate and low priority sites: Revestment Structures, Taper Bank, Live Stake, Armour Channel, Blotunker, Anchor Logs, Gablion Bank, Armour Inlets, Cross-vasces | Soft structures (e.g. vegetative plantings)                     | 1  | Year 3-5  | \$2,000 |
|   |   |  | Hard structures (e.g. revetments)   | 1   | Year 3-5                                 | \$8,000   |         |
| Soft and Hard structures  | TBD   |  |   |   |  |   |         |
| Reduce peak flows for new and existing developments   | uncontrolled storm water runoff on new and existing developments. Less than optimal flood plain, insufficient storage area for flood waters/storm events            | Model the hydrology of the creek/watershed; identify location, configuration, and size of proposed basins; construct wetlands/detention basins and structures; reestablish channel morphology and floodplain functions; obtain vegetative easements within stream corridor; install cross-vasces | Construct storm water detention basins; wetland detention basin, construct retention basins; reconstruct stream channels and floodplains                          | Identify locations for future retention/wetland detention areas | 5 Years                                  | \$ 5,000 to 40,000                              |         |
|   |   |  | Ordinances  | Meet with three townships                                       | Year 1                                   |   |         |
|   |   |  | Wetland protection  | Set up two meetings   | Year 1                                   |   |         |
|   |   |  | Meetings with developers and officials on alternative site plans  | Set up two meetings   | Year 1, 3-5                              |   |         |
|   |   |  | Information and Education   | Meetings with three townships                                   | Year 1                                   |   |         |
| Reestablish riparian zones and reduce temperatures  | Unvegetated riparian zones; thermal discharges; loss of vegetation or shading of the stream corridor; discharges from impoundments                                  | Identify responsible parties of alleged discharges; vegetate stream corridor to provide shading; assess impoundment discharges   | Buffer strips   | Meet with three townships                                       | Year 1                                   | \$ 1,000 to 5,000 (dam structures will be more) |         |
|   |   |  | Wetland protection  | Meet with three townships                                       | Year 1                                   |   |         |
|   |   |  | Landowner workshop on landscaping alternatives  | Hold three township meetings                                    | Year 1                                   |   |         |
|   |   |  | Check dams; live-staking; vegetative plantings  | 1   | Year 1                                   | \$ 1,000 - \$10,000                             |         |
|   |   |  | Information and Education   | Meeting with landowners, NRCS - buffer plan                     | Hold two township meetings               | Year 1  |         |
| Decrease sediment inputs from farmlands - Black Creek   | Discharge of sediment from agricultural fields  | Evaluate farming practices adjacent to stream corridor; implement soil erosion control measures; obtain easements to ensure vegetative buffers are maintained  | Check dams; live-staking; vegetative plantings  | 1   | Year 1                                   | \$ 1,000 - \$10,000                             |         |
|   |   |  | Information and Education   | Meeting with landowners, NRCS - buffer plan                     | Hold two township meetings               | Year 1  |         |
|   |   |  | Check dams; live-staking; vegetative plantings  | 15  | Year 1                                   | \$1,000 - \$10,000                              |         |
|   |   |  | Information and Education   | Meetings with road commissioner                                 | Hold one meeting with Road commissioners | 6 Months  |         |
| Reduce erosion and sedimentation at bridges and culverts  | Eroding side slopes, lack of proper stabilization around structures; improperly sized and/or installed structures   | Stabilize eroding slopes and structures with hard and/or soft structures   | Rock riprap; live-staking; vegetative plantings   | 15  | Year 1                                   | \$20,000  |         |
|   |   |  | Information and Education   | Meetings with road commissioner                                 | Hold one meeting with Road commissioner  | 6 Months  |         |
|   |   |  | Public Meeting  | Hold one meeting with three separate townships                  | Year 2                                   |   |         |
| Hold public information meetings and field workshops to educate the public on the resource values of Kearsley Creek and its surrounding land uses | Lack of public awareness of resource issues and benefits  | Develop and conduct educational meetings/workshops   | Public Meeting  | Hold one meeting with three separate townships                  | Year 2                                   |   |         |
|   |   |  | NA  | TBD   | Year 2                                   |   |         |
| Identify sources of funding for persons placing land into easements   | Incentives for persons to enter properties into vegetative and conservation easements   | Contact various agencies and organizations to seek funding opportunities   |   |   |  |   |         |

**TABLE 6. MONITORING METHODS AND TIMING**

| <b>PARAMETER MEASURED</b>               | <b>METHOD</b>                   | <b>TIMING</b>          | <b>WHO</b>                              |
|---|---------------------------------|------------------------|---|
| Aquatic Macroinvertebrates              | GLEAS Procedure # 51            | Annually               | Technical Experts/WCR                   |
|   | MDEQ Habitat Survey Protocol    |                        |   |
|   | Back Pack Electro-shocking      | Annually               | Technical Experts/WCR                   |
| Fish                                    |                                 |                        |   |
| Habitat Improvement                     | MDEQ Habitat Survey Protocol    | Annually               | Technical Experts/WCR                   |
|   | Visual Observations/Photographs | Initially and Annually | Technical Experts, Volunteers, GCDC/WCR |
|   | NRCS Criteria                   | Annually               | Technical Experts/GCDC                  |
| Sediment/Erosion Control                | Visual Observations/Photographs | On-Going               | Volunteers                              |
|   | TBD                             | TBD                    | Technical Experts/Spicer                |
| Hydrology                               | TBD                             | TBD                    | Technical Experts/Spicer                |
|   | Focus Groups                    | Annually               | Technical Experts, Public/GCDC          |
| Access/Protection and Public Perception | Hach and Temperature Gage       | Annually               | Technical Experts, Volunteers/GCDC      |
|   | Visual Observations             | On-going               | Technical Experts, Public/GCDC          |
| Temperature and Dissolved Oxygen        |                                 |                        |   |
| Debris                                  |                                 |                        |   |