8 Watershed Restoration Goals

The following goals and supporting objectives have been developed based on public concerns, watershed inventory and pollutant loading data, and guidance from steering committee members.

8.1 Recreational Use

Existing Condition:

Water quality data collected during the baseline assessment shows that 60% of the 327 samples collected for *E. coli* exceeded the single sample water quality standard of 235 CFU/100 mL with a median concentration of 344 CFU/100mL and a maximum >2,419 CFU/100 mL.

Goal 1: Reduce watershed *E. coli* loads by 80% so that all waterways meet the state water quality standard of 235 CFU/100 mL (single sample) and 125 CFU/100mL (geomean) during the recreational season (April 1 – October 31) by 2050.

- 10-years: Reduce E. coli loading by 20%
- 20-years: Reduce E. coli loading by 50%
- 30-years: Reduce *E. coli* loading by 70%

Indicators: Water quality will be used as the indicator towards meeting this goal. The environmental indicator will be *E. coli* testing conducted at each impaired site at least monthly during the recreational season following 5 years of implementation.

8.2 Aquatic Life Use

Existing Condition: Biological monitoring data collected during the baseline assessment indicate that the overall biological integrity of the watershed is poor to very poor. More than 94% of the 35 sample sites failed established criteria for aquatic life support during each sampling event with a median Index of Biotic Integrity score of 30 for fish and 28 for macroinvertebrates.

Goal 2: Restore warmwater fish and macroinvertebrate communities so that all waterways meet their aquatic life use designations with natural waterways maintaining at least a “good” integrity class rating and modified waterways maintaining at least a “fair” integrity class rating by 2050.

To achieve this goal, functional lifts are necessary at the hydrology, hydraulic, geomorphology, and physiochemical levels. The following supporting objectives are anticipated to provide this lift. Lower function levels must be addressed to realize functional lift of higher levels.

Indicators: Biological monitoring will be used as the indicator towards meeting this goal. The environmental indicator will be a macroinvertebrate assessment (Hoosier Riverwatch methodology). Ideally, both the fish and macroinvertebrate communities can revaluated by IDEM using their methodologies. Monitoring will be conducted annually at each impaired site once the implementation phase is complete.

Objective 2.1: Improve dissolved oxygen levels so that all waterways are capable of supporting a well balance, warm water community.

- All waterways should maintain a daily average dissolved oxygen concentration >5 mg/L and no less than 4 mg/L at any time.

Indicators: Water quality and streamflow will be used as the indicators towards meeting this goal. The environmental indicators will include dissolved oxygen, temperature, BOD testing and stream flow (Hoosier Riverwatch methodologies) conducted at each impaired site at least monthly following 5 years of implementation.

Objective 2.2: Reduce nutrient and sediment loads from urban and agricultural land uses.

- All waterways should maintain a median total phosphorus concentration of <0.08 mg/L, nitrate concentration <1.09 mg/L, and total suspended solids concentration <30 mg/L.
  - Reduce phosphorus loading from 142,153 lb/year to 46,453 lb/year (67%) and nitrogen loading from 603,411 lb/year to 600,857 lb/year.
    - 10-Years: Reduce nitrogen loading by 128 lb/year (0.02%) and phosphorus loading by 4,785 lb/year (3%).
    - 20-Years: Reduce nitrogen loading by 638 lb/year (0.11%) and phosphorus loading by 23,925 lb/year (17%).
    - 30-Years: Reduce nitrogen loading by 1,915 lb/year (0.32%) and phosphorus loading by 71,774 lb/year (50%).
  - Reduce sediment loads from 9,310 t/year to 5,444 t/year (42%).
    - 10-Years: Reduce sediment loading by 193 t/year (2%).
    - 20-Years: Reduce sediment loading by 966 t/year (10%).
    - 30-Years: Reduce sediment loading by 2,899 t/year (31%).

Indicators: Water quality and pollutant load modeling will be used as the indicators towards meeting this goal. The environmental indicators will include orthophosphate, nitrate and turbidity testing (Hoosier Riverwatch methodologies) at each impaired site at least monthly following 5 years of implementation. Pollutant load models will be run on a project by project basis.

Objective 2.3: Restore riparian vegetation to improve channel stability, nutrient processing, sediment capture, and landscape habitat connectivity.

Indicators: Physical measurement and qualitative measures will be used as the indicators towards meeting this goal. The environmental indicators will be buffer width and length and qualitative visual assessments to assess functioning condition (ex. IDEM QHEI and NRCS SVA). Buffer length and width restored/enhanced will be determined following practice installation. Qualitative visual assessments will be conducted annually for 5 years thereafter.

Objective 2.4: Improve bed form diversity within channelized/incised or dammed stream reaches to increase depth variability and substrate quality.

Indicator: Physical measurement and qualitative measures will be used as the indicators towards meeting this goal. The environmental indicators will be bed material characterization (material size), pool-to-pool spacing and depth variability, and qualitative visual assessments to assess functioning condition (ex. IDEM QHEI and NRCS SVA). Bed material, pool-to-pool spacing and depth variability will be characterized and qualitative visual assessments will be conducted prior to any in-channel implementation activity and continued annually over a total of 5 years.

Objective 2.5: Improve channel stability to reduce suspended and bedded sediments.

Indicators: Physical measurement and qualitative measures will be used as the indicators towards meeting this goal. The environmental indicators will be channel evolution stage/stream succession type and channel profile and cross sections. Channel stage/type and channel profile and cross section will be assessed prior to any in-channel implementation activity and ideally will be reevaluated annually over a total of 5 years.

Objective 2.6: Provide floodplain connectivity for channelized/incised stream reaches to improve channel stability and facilitate sediment storage and nutrient processing outside of the channel.

Indicators: Physical measurement qualitative measures will be used as the indicators towards meeting this goal. The environmental indicators will be bank height and entrenchment ratios and qualitative visual assessments to assess channel condition (ex. NRCS SVA). Bank height and entrenchment ratios will be characterized and qualitative visual assessments will be conducted prior to any in-channel implementation activity and continued annually over a total of 5 years.

Objective 2.7: Reduce storm water runoff volume and rates to improve flow-duration conditions and flow dynamics.

Indicators: Models and flow-duration curves will be used as indicators towards meeting this goal. The environmental indicators will include volume reduction from practice implementation and flow-duration curves. Models that evaluate runoff volume and reductions will be run on a project by project basis. Flow-duration curves will be evaluated after 5 years of implementation.