

FINAL SUMMARY REPORT

CLARK CREEK WATER QUALITY AND MANAGEMENT PROJECT

Sauk County has completed work on the Clark Creek Water Quality and Management Report funded through a 604(b) Stimulus Grant from Wisconsin Department of Natural Resources. The grant was used to pay a portion of the cost of two detailed investigations of the Clark Creek Watershed located in Town of Greenfield, Sauk County. The results of the two studies will be used to direct the efforts of the County to improve both the resource and control excessive erosion and sedimentation within the watershed. Among the ultimate goals of the project are an improved resource and protection for residents impacted by previous flooding of the stream.

More detailed information is available through the two reports on file with the Conservation, Planning and Zoning Department in Sauk County. Those reports are; Clark Creek Watershed Study Final Report, prepared by Montgomery Associates Resource Solutions and Water Quality Survey of Clark Creek, Sauk County, prepared by Dave Marshall, Underwater Habitat Investigations LLC. These reports are available online at <http://www.co.sauk.wi.us/landconservationpage/clark-creek-watershed-study-final-report>.

Additional information was provided through the work of Jean Unmuth, DNR Water Resources Manager and David Rowe, DNR Fishery Manager. This final report is not intended to provide great detail but just to summarize the project deliverables from these two documents.

Flow: Analysis of flows in the Montgomery Associates report as well as those performed for preparation of the Flood Insurance Rate Map indicates the 2008 flooding was an extreme occurrence. Flow rates and damage incurred appear to be in great part to the debris carried in the stream during the flood event and by the sediment transported by the stream. Efforts to reduce the amount of debris available for transport could be an important step toward reducing future flooding. The re-establishment of a defined stream channel will also help reduce the incidence of the stream leaving the channel and scouring new routes down the hillside. Flows not impacted by carried debris or sediment transport appear to be within manageable volumes for the culverts located along the route in 100 year storm events.

Hydrology and Geomorphology: The Montgomery Associates study highlights the morphology of the watershed starting with a large upland watershed made up of shallow soils underlain by bedrock of limited permeability. This large upland watershed area then constricts into a narrow channel that travels through the terminal moraine down a steep elevation drop before leveling out into a broad flood plain and entering the Baraboo River. The study identifies the vulnerability this combination of geologic and topographic conditions generates to high runoff rates, extreme levels of erosion, and frequent downstream flooding.

Water Clarity: The high gradient stream displayed aesthetically pleasing conditions as clear water cascaded over boulders and gravel. The transparency exceeded the 120 cm maximum on both July 22 and 25. Turbidity was nearly non-existent and reached only 1.9 NTU on July 22 and 1.4 NTU on July 25. The flow rate was measured at 3.83 cfs on July 22 and 3.49 cfs on July 25.

Water chemistry: The dissolved oxygen was measured above minimum criterion on both dates; 9.1 mg/l on July 22 and 8.4 mg/l on July 25. Minimal primary production, in either the form of periphytic growths or filamentous algae, was found in the stream and therefore significant diurnal dissolved oxygen fluctuations are unlikely. The dearth of primary production also

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reflected modest organic or nutrient loading to the stream. The pH and specific conductance measurements were typical for Driftless Area streams; pH = 8.59 and 8.61 s.u. and specific conductance = 498 and 488 uS/cm. These values indicated that the stream displayed alkaline conditions with a modest amount of dissolved minerals.

Temperature: Figure 1 displays three days of water temperatures that ranged from a minimum of 14.9 C (57 F) to 26.9 C (81 F). The daily fluctuations of up to 12 C reflected diurnal effects of strong sunlight coupled with near record air temperatures. The average water temperature was 19.9 C. The complete dataset is presented in Table 1.

Macroinvertebrates: Clark Creek supported a diverse benthic macroinvertebrate community that included 11 family groups. Most of the aquatic insect taxa collected were early instars or immature larval forms as expected are during the summer months. More families would likely be found during Spring or Fall collections when more mature instars exist. Regardless, the Family-level Biotic Index (FBI) for the stream was calculated at 4.06 or “Very Good Water Quality” (Hilsenhoff 1988). The Ephemeroptera-Plecoptera-Tricoptera (EPT) family index was 5. Figure 2 displays the taxonomic groups that were identified including the numbers found.