

SUMMARY OF SESSIONS CREEK WATERSHED ASSESSMENT IONIA, MICHIGAN

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INTRODUCTION

The Sessions Creek watershed is located in east-central Ionia County in northern Berlin Township. **DESCRIPTION:** It originates at southeast of the Saranac in a primarily rural area with low density residential use. It then flows north towards the Ionia State Recreation Area where it joins the Grand River. Michigan Department of Environmental Quality (MDEQ) field staff surveyed road/stream crossings within the watershed to quickly assess the health of the watershed. The survey combined both qualitative and quantitative assessment of Sessions Creek and its tributaries and provided a basis upon which to identify any potential sources of non point source pollution negatively affecting the watershed. In total, 14 road/stream crossing locations were surveyed during the assessment of the Sessions Creek Watershed. Refer to the Road Stream Crossings Inventory for a summary of the survey locations conducted during September of 2004, as well as survey location maps. Site identification codes were developed using four letter identifiers for the subwatershed followed by the four digit site location number. Sites were numbered successively from the mouth to the headwaters.

METHODS

The DEQ's stream crossing watershed survey procedure was developed as a quick screening tool to assess general water quality and possible pollutant sources, causes and problems within the watershed. The survey procedure provides standardized visual assessments that can be conducted by DEQ staff or trained volunteers. Only observations that can be made from the road stream crossings are recorded; recording "educated guesses" or suspicions is prohibited. Because this assessment is based on visual observations, designed to be conducted quickly and by many different types of people and knowledge backgrounds, the survey results are only qualitative in nature.

A minimum of 30% of the road stream crossings within a watershed are to be surveyed with attention given to balanced geographical coverage and assessment across major land use changes and possible pollutant sources. Surveys are always conducted in one general direction (either upstream to downstream OR downstream to upstream), and the attempt is made to keep the surveyors and weather conditions consistent to limit bias and subjectivity between surveyors. This survey was conducted from the upstream to downstream direction and was completed in one day by two DEQ field staff. The right and left bank designations are always assigned based on looking downstream at each road stream crossing location.

At each survey location the following stream conditions are visually assessed:

- Weather and any event conditions
- Culvert/bridge conditions
- Channel conditions (width, depth, high water mark, riffles, pools, natural, maintained, recovering)
- Stream appearance (color, turbidity, algae, aquatic plants, trash, oil sheen, bacteria, foam)

- Substrate composition (boulder, gravel, silt, sand, unknown)
- In-stream Cover (undercut banks, overhanging vegetation, woody debris, pools, boulders, plants)
- Stream corridor (riparian vegetation type and width, bank erosion, canopy cover, adjacent land use)
- Potential Pollutant Sources (source and pathway identification)

At each survey location the following stream conditions are directly measured:

- Water temperature
- Dissolved oxygen content
- pH
- flow velocity
- latitude and longitude coordinates (GPS)

In addition each site was photo-documented with a digital picture taken in the downstream direction, upstream direction and of the road crossing. Refer to the DEQ's *Stream Crossing Watershed Survey Procedure* for further information and a complete description of the above conditions.

OBSERVATIONS

Water Temperature, pH, and Dissolved Oxygen

Survey locations were assessed in the order of upstream sites (in the headwaters) to downstream sites (towards the mouth). 14 locations were measured for temperature, DO, and pH. pH values ranged from 7.04 to 8.12, which were not outside of the normal range for streams within Michigan. Overall the average temperature was 57.5°F. Normal stream temperatures capable of supporting a coldwater fishery with few diseases are below 57°F. Walleye, northern pike and some trout are adapted to temperatures between 57° to 58°F while temperatures over 58°F are characteristic of fish communities characterized by bass, crappie, bluegill, carp and sucker with occurrence of fish disease high. The cool early fall temperatures in Sessions Creek are comfortable for many species. The average dissolved oxygen content is 6.04 ppm; it varies from 9.22 ppm at station SESS-14 to a measurement of 0.21ppm at SESSIONS-03 where there is very low flow. The dissolved oxygen requirement for native bass and crappie growth and well-being is 5 ppm and for trout it is at least 5 ppm. Given the relatively high average oxygen content at most locations (the main stem DO never goes below 7 ppm), Sessions Creek is a comfortable environment for aquatic life. Refer to Figure 1, which depicts the temperature, pH, and DO levels at all main stem locations.

Substrate

Substrate was observed and quantified for both the upstream and downstream stretch at each survey location. In all, 28 substrate observations were recorded at 14 locations. Substrate type is important when considering habitat suitability for desired species within the system (i.e. trout and other fish species). Cobble and gravel substrate with a low degree of embeddedness are the most suitable for reproduction in many fish species and is important for macro invertebrates as well. Evidence of silt and sand dominated

substrate could indicate problems within the watershed such as erosion and sedimentation. Among the survey locations within the Sessions Creek Watershed, 4 sites were dominated (50 to 100% covered) by sand, 17 were dominated silt, detritus or muck, and 3 sites were dominated by gravel (note: some sites had equal amounts of sand and silt and some substrate observations were prohibited). The substrate content becomes more variable as it flows downstream. Refer to Figure 2 for a graph depicting the substrate composition for those survey locations located along the main stem of Sessions Creek.

In-Stream Cover

The presence of in-stream cover was assessed at each location for both the upstream and downstream stretches. In-stream cover, such as overhanging vegetation, undercut banks, deep pools, boulders, plant cover and large woody debris provide habitat for macro invertebrates and aquatic organisms such as amphibians and fish. Of the 28 observations made, 100% had overhanging vegetation, 54% had woody debris, and 21% had boulders. Some sites also had undercut banks and aquatic plant cover. Refer to Table 1 for a summary of the in-stream cover observations made at each survey location.

Physical Appearance

The physical appearance of the stream at each survey location was assessed based on the presence or absence of aquatic plants, floating algae, filamentous algae, bacterial slimes, turbidity, oil sheen, foam and/or trash. In all, 28 sites were assessed for physical appearance; observations were recorded and rated as either present or abundant. No oil sheens were observed at any of the sites. Filamentous algae were witnessed at 64%, aquatic plants were at 46%, and turbidity was at about 32% of the observations. There were also instances of floating algae, bacterial slime, and trash. Refer to Table 2 for a summary of the physical appearance observations made for each survey location.

Stream Corridor

The width of riparian vegetation was assessed at each survey location for both the right and left banks of the upstream and downstream stretches. The presence of riparian vegetation reduces the amount of surface water runoff to streams, provides a filter strip for nutrients within runoff waters, provides overhanging vegetation for stream habitat, provides a source of woody debris, stabilizes stream banks against erosion and determines the availability of sufficient stream canopy cover for temperature regulation. 14 survey locations were assessed, resulting in 56 observations of riparian vegetation width recorded. The observations fell into four width categories: 70% had less than 10 feet, 21% had between 10 and 30 feet, 2% had between 30 and 100 feet, and only 7% had greater than 100 feet of riparian vegetation. The streamside land cover, estimated bank erosion and percent stream canopy were evaluated at each of the 14 survey locations for both the upstream and downstream stretches. In all, 28 observations were made for each of the above listed characteristics. Of the survey locations, 32% were recorded as having predominantly grasses, 64% were dominated by trees, and one observation had bare ground. In general, vegetation such as grasses and shrubs and residential and agricultural land uses, are associated with narrow riparian widths. More extensive riparian vegetation is usually associated with forests and old fields. Bank erosion was a slight problem within

this subwatershed. Refer to Table 3 for the distribution of riparian width and vegetation observations made for both the right and left bank at each survey location.

Stream canopy cover is important for providing shade and maintaining cool temperatures within the stream. Cooler temperatures also helps keep dissolved oxygen levels from depleting, an important habitat requirement for many fish species and other aquatic organisms. Of the 28 observations made, 7 had less than 25% cover, 15 had between 25 and 50% cover and 6 had over 50% cover.

Adjacent Land Uses

Adjacent land uses were recorded at each survey location for both the upstream and downstream stretches as well as both the right and left banks. Because the entire section of stream that can be seen from the road crossing is evaluated, multiple land uses can be recorded for each site. Land uses within the watershed play an important role in nutrient input, erosion, and in-stream conditions that affect water quality, quantity and habitat. The most common adjacent land uses in the Sessions Creek Sub watershed were maintained lawn and shrub/old field. Forest and impervious surfaces were also common uses. Refer to Attachment B, Table 4 and Figures 3 for a summary of all the adjacent land uses recorded within the watershed.

Potential pathways of non-point source pollution

During the completion of the road stream crossing surveys, field staff also evaluated the *potential* for non point source pollution. This assessment focuses on the severity of potential pollutant *inputs*, not pollutant *impacts*. As part of this evaluation process field staff look for 1.) a possible pollutant source, 2.) a potential pathway to the water body and 3.) potential severity of the input. Because each potential source was given a ranking of slight, moderate and high for severity, the values recorded were weighted before they were summed for each category (Refer to Figure 4). Observations recorded as slight were considered to be the basis for comparison, therefore observations recorded as moderate were multiplied by 1.5 and observations recorded as high were multiplied by 2. In Sessions Creek, the potential non point source pollution from transportation and crop related sources were the most serious while stream bank erosion, grazing, urban/residential runoff, hydrology, and riparian vegetation removal were also considered possible sources of NPS pollution. Refer to Table 5 for a summary of the non point source pollution observations identified for each survey location.

RESULTS

Stations in along Sessions Creek are denoted by SESS prefixes. Refer to Attachment C for site photos and to Attachment D for site survey forms. The following conditions and comments were recorded on the survey forms:

SESS-01: Harwood north of Goodemote

Water temperature was 58° F, pH was 7.16, and the DO was recorded as 2.14 ppm. Sand and silt appeared to dominate the substrate. Overhanging vegetation was available for in-stream cover. Abundant aquatic plants and some floating algae were observed. Little riparian vegetation width was available. grasses made up the land cover. Adjacent land uses included cropland. Potential non point source pollution (NPS) was categorized as slight for transportation, moderate for upstream crops, and high for downstream crops. Comments were: *Very small creek; almost covered by overhanging vegetation; very steep banks through corn field*

SESS-02: Portland east of Harwood

Water temperature was 56° F, pH was 7.04, and the DO was recorded as 0.38 ppm. Substrate observations were prohibited. Overhanging vegetation and aquatic plant cover were available for in-stream cover. Abundant aquatic plants, floating algae, and filamentous algae were observed. Little riparian vegetation width was available. grasses and bare ground made up the land cover. Adjacent land uses included cropland. Potential non point source pollution (NPS) was categorized as slight for transportation and high for crops. Comments were: *Lots of debris upstream; choked with algae and duckweed- no flow upstream or downstream*

SESS-03: Harwood south of I-96

Water temperature was 55° F, pH was 7.13, and the DO was recorded as 0.21 ppm. Substrate observations were prohibited. Overhanging vegetation, aquatic plant cover, and woody debris were available for in-stream cover. Abundant aquatic plants and some filamentous algae were observed. Little riparian vegetation width was available. grasses and trees made up the land cover. Adjacent land uses included cropland, impervious surfaces, and shrub/old field. Potential non point source pollution (NPS) was categorized as slight for downstream transportation and moderate for crops and upstream transportation. Comments were: *Couldn't observe substrate due to duckweed*

SESS-04: Grand River east of Harwood

Water temperature was 56° F, pH was 7.54, and the DO was recorded as 5.78 ppm. Sand and silt appeared to dominate the substrate. Undercut banks, overhanging vegetation, and woody debris were available for in-stream cover. Some turbidity and downstream filamentous algae were observed. Little riparian vegetation width was available. trees made up the land cover. Adjacent land uses included cropland and maintained lawn. Potential non point source pollution (NPS) was categorized as slight for transportation and

upstream hydrology, moderate for downstream crops and upstream urban/residential runoff, and high for downstream urban/residential runoff. Comments were: *Downstream landowner dumping grass cuttings on streambank*

SESS-05: Harwood north of Grand River

Water temperature was 54° F, pH was 7.67, and the DO was recorded as 7.57 ppm. Silt appeared to dominate the substrate. Undercut banks, overhanging vegetation, and woody debris were available for in-stream cover. Some upstream aquatic plants and floating algae and abundant downstream aquatic plants were observed. Little riparian vegetation width was available. Trees made up the land cover. Adjacent land uses included cropland, shrub/old field, and forest. Potential non point source pollution (NPS) was categorized as slight for crops and downstream transportation and moderate for upstream transportation, streambank erosion, and hydrology. Comments were: *Some areas show erosion from high flow: is evident especially from side road ditches on upstream side*

SESS-06: Peck Lake Road east of Harwood

Water temperature was 57° F, pH was 7.82, and the DO was recorded as 7.45 ppm. Silt appeared to dominate the substrate. Overhanging vegetation and woody debris were available for in-stream cover. Some filamentous algae and turbidity were observed. Little riparian vegetation width was available. Trees made up the land cover. Adjacent land uses included cropland and maintained lawn. Potential non point source pollution (NPS) was categorized as slight for transportation and upstream crops and moderate for downstream crops. Comments were: *Animal waste on upstream culvert*

SESS-07: Harwood north of Peck Lake

Water temperature was 58° F, pH was 7.92, and the DO was recorded as 7.81 ppm. Silt appeared to dominate the substrate. Overhanging vegetation was available for in-stream cover. Some turbidity was observed. Little riparian vegetation width was available. Grasses made up the land cover. Adjacent land uses included pasture. Potential non point source pollution (NPS) was categorized as slight for transportation, moderate for riparian vegetation removal, and high for streambank erosion and grazing. Comments were: *Cattle have unrestricted access to stream on both sides of road; major streambank destruction in some area; also looks like cattle are actually using culvert as a tunnel to cross the road; no cattle actually observed at the time of the survey (5677 Harwood)*

SESS-08: Ainsworth south of David Hwy

Water temperature was 59° F, pH was 8.06, and the DO was recorded as 8.63 ppm. Silt appeared to dominate the substrate with lesser amounts of sand and gravel also present. Overhanging vegetation, boulders, and woody debris were available for in-stream cover. Abundant filamentous algae upstream and some downstream were observed. Little to moderate riparian vegetation width was available. trees made up the land cover. Adjacent land uses included shrub/old field, forest, and maintained lawn. Potential non point source pollution (NPS) was categorized as slight for transportation. Comments were: *No specific comments were recorded for this site*

SESS-09: David Hwy north of Ainsworth

Water temperature was 58° F, pH was 8.12, and the DO was recorded as 8.81 ppm. Silt appeared to dominate the substrate with lesser amounts of sand and gravel also present. Overhanging vegetation, boulders, and woody debris were available for in-stream cover. Some filamentous algae were observed. Little to moderate riparian vegetation width was available. trees made up the land cover. Adjacent land uses included shrub/old field, forest, and maintained lawn. Potential non point source pollution (NPS) was categorized as slight for transportation and upstream urban/residential runoff. Comments were: *No specific comments were recorded for this site*

SESS-10: David Hwy east of Jordan Lake

Water temperature was 59° F, pH was 7.73, and the DO was recorded as 7.76 ppm. Sand and silt appeared to dominate the substrate. Overhanging vegetation and woody debris were available for in-stream cover. Some bacterial slime and abundant turbidity downstream were observed. Little to moderate riparian vegetation width was available. grasses and trees made up the land cover. Adjacent land uses included shrub/old field and cropland. Potential non point source pollution (NPS) was categorized as slight for crops and transportation. Comments were: *Upstream side is very small; view obstructed by overhanging grass*

SESS-11: Bennett west of Jordan Lake

Water temperature was 60° F, pH was 7.55, and the DO was recorded as 4.62 ppm. Silt appeared to dominate the substrate. Overhanging vegetation and woody debris were available for in-stream cover. Some aquatic plants upstream and filamentous algae downstream were observed. Little riparian vegetation width was available. trees made up the land cover. Adjacent land uses included pasture and cropland. Potential non point source pollution

(NPS) was categorized as slight for crops, transportation and upstream grazing. Comments were: *Pasture looks fenced out at stream*

SESS-12: David Hwy west of Jordan Lake

Water temperature was 55° F, pH was 7.71, and the DO was recorded as 7.18 ppm. Silt appeared to dominate the substrate with lesser amounts of also present. Overhanging vegetation was available for in-stream cover. Some overhanging vegetation was observed. Moderate riparian vegetation width was available. grasses made up the land cover. Adjacent land uses included forest, shrub/old field, and wetlands. Potential non point source pollution (NPS) was categorized as slight for transportation. Comments were: *No specific comments were recorded for this site*

SESS-13: Jordan Lake road north of David Hwy

Water temperature was 60° F, pH was 7.91, and the DO was recorded as 7.03 ppm. Silt appeared to dominate the substrate with lesser amounts of gravel also present. Overhanging vegetation was available for in-stream cover. Some aquatic plants and turbidity and abundant filamentous algae were observed. Little to moderate riparian vegetation width was available. trees made up the land cover. Adjacent land uses included forest, shrub/old field, and wetlands. Potential non point source pollution (NPS) was categorized as slight for transportation. Comments were: *This crossing inside Ionia State Recreation Area*

SESS-14: Riverside Dr. east of Jordan Lake

Water temperature was 60° F, pH was 8.03, and the DO was recorded as 9.22 ppm. Sand and gravel appeared to dominate the substrate with lesser amounts of silt and boulders also present. Overhanging vegetation, boulders, and woody debris were available for in-stream cover. Some filamentous algae were observed. Abundant riparian vegetation width was available. trees made up the land cover. Adjacent land uses included shrub/old field. Potential non point source pollution (NPS) was categorized as slight for transportation. Comments were: *In the Ionia State Recreation Area.*

The majority of the impacts to the stream in this area seem to result from transportation erosion or erosion due to the road stream crossing (sand/gravel roads, road washout) and crop related sources. Stream bank erosion and grazing also account for a significant amount of possible non point sources in this tributary to the Grand River.