

# **Quality Assurance Project Plan (QAPP) - Vegetation Survey of Huron Creek**

Houghton, MI

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Date

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Figure 3 – Vegetation Zones and Transect Locations

## 1.0 INTRODUCTION

The Huron Creek watershed is an approximate 3.4 square mile watershed that is located in north central Houghton County in the Upper Peninsula of Michigan (Figure 1). A multi-part vegetation survey is planned to be completed on Huron Creek as part of the creation of a watershed management plan. This document provides a description of monitoring and quality assurance methods to be used in the form a Quality Assurance Project Plan (QAPP). This QAPP has been prepared based on the Michigan Department of Environmental Quality's (MDEQ) guidance document "*Quality Assurance Project Plan (QAPP) Guidance for Water Quality Monitoring*." The following sections are included:

- Project Management
- Study Design
- Measurement/Data Acquisition
- Data Validation and Usability

A references section and distribution list are included at the end of this document.

## 2.0 PROJECT MANAGEMENT

### 2.1 Project/Task Organization

#### Key Personnel

Dr. Alex Mayer – Director, Michigan Tech Center for Water & Society  
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#### Roles and Responsibilities

Dr. Alex Mayer and the Center for Water & Society (CWS) will provide oversight of survey activities, data management and analysis, and quality assurance. Linda Kersten will coordinate and complete vegetation surveys, as well as manage data and analyze results.

### 2.2 Problem Definition and Background

A holistic approach to watershed management is often used to address water quality, habitat and other environmental issues in a watershed. Usually a component of this approach is evaluation of vegetation, especially in riparian areas. Data collected from vegetation evaluations can then be applied to management of riparian habitat, bank conditions or the overall revegetation of the corridor.

Vegetation surveys in the Huron Creek corridor will be designed to achieve the following overall goals:

- (1) Provide a baseline of vegetation data for future comparison
- (2) Provide data for use in relating vegetative conditions with other characteristics such as geomorphology, land use, or water quality.

- (3) Provide data for use in recommending BMPs for the Huron Creek watershed management plan.

The watershed management plan is currently being written by Linda Kersten and Dr. Alex Mayer of the MTU Center for Water & Society (CWS). Survey results will be made available to the public through the final watershed management plan.

### 2.3 Project/Task Description

The Huron Creek watershed vegetation study consists of the following survey types:

- Vegetative Buffer Survey
- Vegetation Transect Survey

Both surveys are expected to be completed in September 2007. This is the only time the survey will be completed by MTU and CWS<sup>1</sup>. The following is a brief description of each survey:

Vegetative Buffer Survey – A survey to be completed using the most recent aerial photography (2005) and Geographic Information Systems (GIS) to quantify amounts and locations of vegetative cover within a designated buffer zone.

Vegetation Transect Survey – A vegetation species survey to be completed on the ground at designated transect locations, across the buffer zone. Percent cover by vegetative stratum will also be included.

Methods for each type of survey are described in more detail in section 3.0.

### 2.4 Data Quality Objectives

All field data collection will be completed by Linda Kersten and other staff who will follow the methods described in this QAPP. The level of quality required is such that the resulting data:

- Falls within a value range that is reasonable
- Can be easily reproduced under similar conditions (within a reasonable range of precision)

The following table describes quality assurance criteria for each vegetation survey type:

*Table 1 – Data Quality Assurance Criteria*

Procedure	Accuracy	Precision	Representativeness/ Comparability	Completeness
<b><i>Vegetative Buffer Survey</i></b>	Zoom in on photo sufficiently to accurately define areas and measure distances.	Based on precision of GIS.	N/A	100%
<b><i>Vegetation Transect Survey</i></b>	Take vegetation samples as needed to confirm species with key.	Double check percent cover estimates.	Note any areas observed of differing vegetation/habitat within zone that may need additional characterization.	100%

<sup>1</sup> This QAPP only covers the survey completed by MTU and CWS in 2007. Future surveys carried out as part of the Huron Creek watershed management plan are planned to be completed by the public/volunteers. These surveys are planned to be more simplified, but comparable in nature.

## 2.5 Training Requirements

All vegetation data collection and results analysis will be completed by Linda Kersten and/or staff assistants that have sufficient background in vegetation identification to participate. Any persons assisting in these tasks will be trained prior to the survey event in the following:

- Proper sampling and observational techniques
- Proper data documentation

Persons assisting in these activities (staff) will be MTU undergraduate or graduate students, or persons from the community who have an interest in the project.

## 2.6 Documentation and Records

Results of the vegetation surveys will be maintained as hardcopies, Excel spreadsheets, ArcMap files or image files, and kept by Dr. Alex Mayer at the MTU CWS. The records will be kept on file and will not be discarded or deleted. Summaries of results and methods will be included in the Huron Creek watershed management plan.

## 3.0 STUDY DESIGN & DATA ACQUISITION

### 3.1 Vegetative Buffer Survey

The purpose of this survey is to provide a quantitative characterization of vegetative cover along and near Huron Creek. The designated buffer distance (200 feet) and area to be evaluated is shown in the attached Figure 2. Please note that the 200-foot buffer distance indicated on Figure 2 shows a 200-foot distance on each side of the creek for a total buffer width of 400'.

The 2005 1-meter aerial photo of the Huron Creek Watershed will be viewed electronically using ArcMap 9.1. ArcMap will then be used to draw polygons around areas within the buffer zone that fall into one of the following categories<sup>2</sup>:

1. Buffer Width (BW) = 400 feet
2.  $200 \text{ feet} \leq \text{BW} < 400 \text{ feet}$
3.  $100 \text{ feet} \leq \text{BW} < 200 \text{ feet}$
4.  $0 \text{ feet} \leq \text{BW} < 100 \text{ feet}$

Buffer Width is defined as the width of dense vegetation that extends outward into the buffer from the creek bank. "Dense" is defined as any area of vegetation that is continuous and easily distinguished on the aerial photo.

The polygons drawn will be part of a geodatabase that will allow calculation of total buffer area for each category listed above.

The resulting data will be maintained in ArcMap files and/or hardcopies that will be kept by Alex Mayer at the MTU Center for Water and Society.

### 3.2 Vegetation Transect Survey

The vegetation transect survey is designed for documentation of species and percent cover within riparian areas. Transect locations were chosen within zones having similar vegetation/habitat characteristics<sup>3</sup>. These locations and zones are indicated on Figure 3. Generally one transect will be completed per vegetation zone, with a few exceptions for impacted areas or large zones.

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<sup>2</sup> Distances are based on what is reasonably determinable using a 1-m digital aerial photo.

<sup>3</sup> These areas were determined by Linda Kersten through previous observation of the Huron Creek corridor/riparian zones.

At each transect location, a number of data collection “plots” will be completed across the riparian zone, perpendicular to the creek. These plots will consist of the following subplots:

- Circular plots of 5-foot radius for herbaceous plants
- Circular plots of 25-foot radius for shrubs, saplings, trees and woody vines<sup>4</sup>.

The number of overall vegetation plots completed in a transect is dependent on the width of continuous vegetation extending across the riparian zone:

- Width of continuous vegetation  $\leq 50'$  → Complete 1 data plot
- $50' \leq$  Width of continuous vegetation  $\leq 100'$  → Complete 2 data plots
- Width of vegetation  $\geq 100'$  → Complete 3 data plots

At each plot location, all species present will be identified and recorded in a field book along with the percent vegetative cover for each stratum (herbaceous, shrub, tree). GPS coordinates of each plot location will also be recorded along with a name for each plot such as “Transect 1, Plot 1” and “Transect 2, Plot 3,” etc. A photo will also be taken at each plot location.

Microsoft Excel tables will be created from the field data collected and linked to a GIS map of the transect locations. Percent cover data may also be entered into GIS and displayed graphically on the map for visual-spatial interpretation.

The resulting data will be maintained in MS Excel files, ArcMap files and hardcopies that will be kept by Alex Mayer at the MTU Center for Water and Society.

#### **4.0 DATA VALIDATION AND USABILITY**

Vegetation data will be review by Linda Kersten and Alex Mayer for validation and usability. Data that is identified as meeting the quality control criteria will be used in identifying critical areas and appropriate BMPs for the watershed management plan.

#### **5.0 REFERENCES**

- Houghton Keweenaw Conservation District. *Quality Assurance Project Plan for the Eagle River Watershed Management Plan*. 2006.
- Michigan Department of Environmental Quality. *Quality Assurance Project Plan (QAPP) Guidance for Water Quality Monitoring*.
- U.S. Army Corps of Engineers. *U.S. Army Corps of Engineers Wetlands Delineation Manual*.1987.

#### **6.0 DISTRIBUTION LIST**

- Joe Rathbun, NPS Monitoring Coordinator, Michigan Department of Environmental Quality
- Chad Kotke, NPS Grants Coordination, Michigan Department of Environmental Quality
- Center for Water and Society, Michigan Technological University

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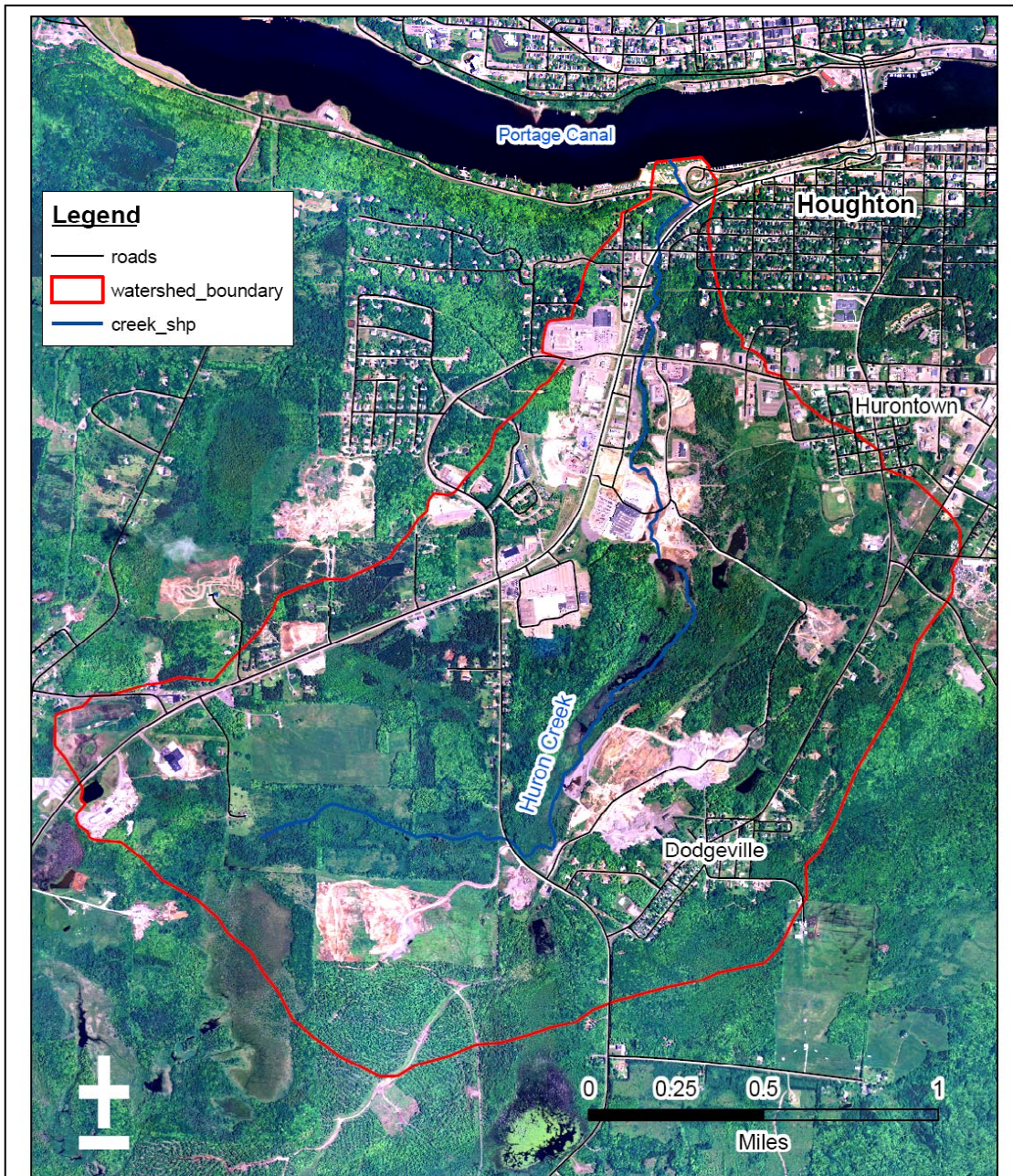
<sup>4</sup> Based on vegetation sampling methodology from the 1987 U.S. Army Corps of Engineers Wetland Delineation Manual. Large radius plot reduced from 30' to 25'.

**FIGURES**

Figure 1 – Huron Creek Watershed

Figure 2 – Buffer Survey Area

Figure 3 – Vegetation Zones and Transect Locations

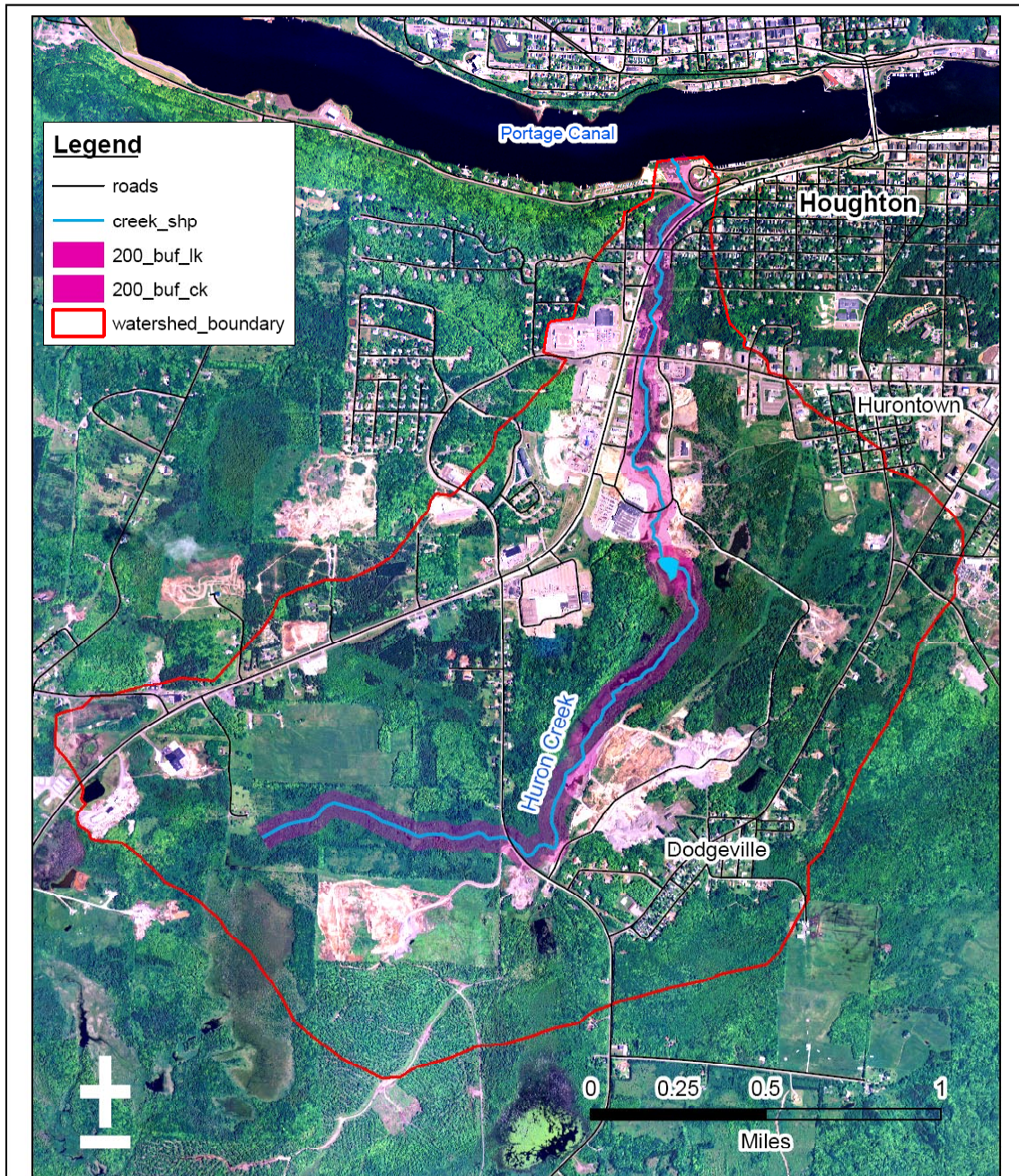


**Figure 1 - Huron Creek Watershed**

Houghton, MI

Created By: Linda Kersten, 12/20/06  
Map Projection: NAD 1927 UTM Zone 16N

Data Source: 2005 NAIP 1-meter  
Digital Orthophoto

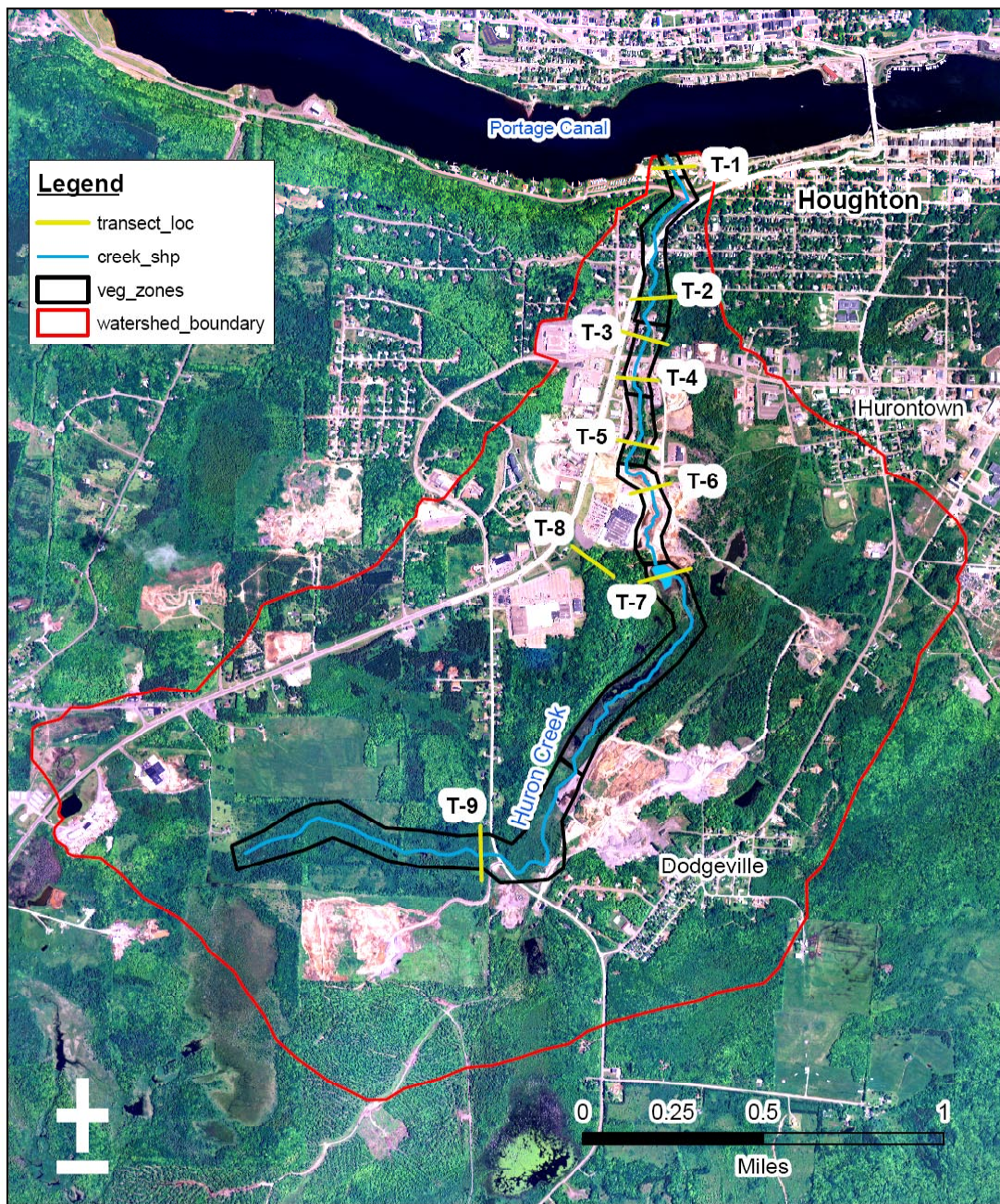


**Figure 2 - Buffer Survey Area (Aerial Photo)**

Huron Creek Watershed  
Houghton, MI

Created By: Linda Kersten, 9/17/07  
Map Projection: NAD 1927 UTM Zone 16N

Data Source: 2005 NAIP 1-meter  
Digital Orthophoto



**Revised Figure 3 - Vegetation Zones and Transect Locations**

Huron Creek Watershed

Houghton, MI

Created By: Linda Kersten, 10/3/07  
Map Projection: NAD 1927 UTM Zone 16N

Data Source: 2005 NAIP 1-meter  
Digital Orthophoto