TECHNICAL MEMORANDUM NO. 1
2009 FIELD SAMPLING PROGRAM TO SUPPORT THE
ECOLOGICAL RISK ASSESSMENT OF KOPPERS POND
KENTUCKY AVENUE WELLFIELD SUPERFUND SITE
OPERABLE UNIT 4
HORSEHEADS, NEW YORK

1.0 INTRODUCTION

The Koppers Pond RI/FS Group (the Group) retained Cummings/Riter Consultants, Inc. and AMEC Earth and Environmental, Inc. (AMEC) to conduct data-gathering and evaluation activities for the performance of a Remedial Investigation and Feasibility Study (RI/FS) for Koppers Pond (Operable Unit 4, Kentucky Avenue Wellfield Superfund Site) in Horseheads, New York (the Site). The RI/FS is being performed in accordance with the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act, as amended (CERCLA or "Superfund"); the National Oil and Hazardous Substances Pollution Contingency Plan; and, more specifically, the Administrative Settlement Agreement and Order on Consent for Remedial Investigation/Feasibility Study, Index No. CERCLA-02-2006-2025 (Settlement Agreement), entered between the Group and the U.S. Environmental Protection Agency (USEPA) on September 28, 2006.

On behalf of the Group, AMEC has prepared this technical memorandum that outlines the proposed 2009 field sampling to support the Ecological Risk Assessment and to meet the requirements of Task VII of the Statement of Work appended to the Settlement Agreement (Section VII.B.2). Additional field sampling activities that may be needed to fill data gaps (e.g., sampling of reference ponds) will be presented in the ERAGS Steps 3 through 5 Report, which will be submitted to USEPA in the fall of 2009.

1.1 SITE BACKGROUND

The Kentucky Avenue Wellfield Superfund Site is located within the Village of Horseheads and the Town of Horseheads in Chemung County, New York. The Kentucky Avenue Well is a municipal water supply well owned by the Elmira Water Board (EWB) that was used as part of the EWB system to furnish potable water to local communities. The Kentucky Avenue Well was closed in 1980 when it was found that the groundwater produced from this well contained

trichloroethylene. In 1983, USEPA included the Kentucky Avenue Wellfield Site on the National Priorities List for response actions under CERCLA.

Beginning in the mid-1980s, several CERCLA response actions have been completed with respect to the Kentucky Avenue Wellfield Site:

- Operable Unit 1 involved initial Site investigations, identification of potentially impacted private wells, and connection of the affected residents to the public water supply system.

- Operable Unit 2 included supplemental investigations of the degree and extent of groundwater impacts, the installation of barrier wells and groundwater treatment system to intercept groundwater at the downgradient limits of the former Westinghouse Electric Corporation (Westinghouse) Horseheads plant site, and restoration of the Kentucky Avenue Well.

- Operable Unit 3 comprised the investigation and remediation of identified source areas at the former Westinghouse Horseheads plant site, the investigation of a waterway (i.e., the "Industrial Drainageway") that conveys surface water discharges from the former Westinghouse Horseheads plant site to Koppers Pond, and the remediation of the Industrial Drainageway.

The response actions specified under Operable Units 1 and 3 are completed. Operation, maintenance, and monitoring activities are continuing with respect to the barrier wells and attendant groundwater treatment system installed under Operable Unit 2. The RI for Koppers Pond is being conducted under Operable Unit 4.

Koppers Pond is a man-made, V-shaped pond located in the Village of Horseheads, New York (Figure 1-1). At the northern end of its western leg, the pond receives inflow from the Industrial Drainageway, the watershed for which is a largely a commercial and industrial area. The drainageway receives much of its base flow from discharges originating at the former Westinghouse Horseheads plant site (Figure 1-1). The overflow from Koppers Pond discharges to two outlet streams located at the southern end of the pond, which combine to form a single outlet channel.

Koppers Pond is a shallow, flow-through water body with typical water depths of approximately two to six feet. Because of the relatively flat topography, the open water area of the pond is highly dependent on the surface water elevation, and open water areas of approximately seven to more than nine acres have been reported in the various studies of this pond. At a pond

surface water elevation of approximately 886 feet above mean sea level, the open water area of the pond covers about 8.9 acres. Water levels are lower than previously observed, presumably due to the removal of beaver dams that had been constructed in the outlets from the pond.

2.0 PROPOSED FIELD SAMPLING PROTOCOLS TO DETERMINE THE PRESENCE OF SLENDER PONDWEED AT KOPPERS POND

Appendix A of the *Screening Level Ecological Risk Assessment* (SLERA) prepared for Koppers Pond (AMEC, 2009) compiled the correspondence with the New York Natural Heritage Program (NYNHP) and the New York State Department of Environmental Conservation (NYSDEC) concerning whether there were reported observations of rare, threatened, or endangered (RTE) species at or near the Koppers Pond Site. In December 2008, the RTE summary was updated by NYNHP to include the potential presence of slender pondweed (*Stuckenia filiformis alpinus*) at or near Koppers Pond. This inclusion was based on a historical record from 1943 that this species was reported "in cold brook, Chemung Street, Horseheads." The presence of this species in Koppers Pond under current environmental conditions will be determined as part of the supplemental field investigation. In addition, a determination will be made as to whether the habitats of Koppers Pond and the outlet channels are suitable to support this species.

There are several EPA and New York guidance documents available for surveying aquatic macrophytes. USEPA (1998b) provides guidance for surveying of aquatic macrophytes that can be performed as part of the bioassessment of lakes and reservoirs. New York guidance documents describing aquatic plant survey methods include NYSDEC (1995, 2006) and the New York Citizens Statewide Lake Assessment Program (NYSCLAP) (2009).

Generally, these guidance documents are designed for more comprehensive aquatic plant surveys than are required for this project. In addition, most of the methods described therein use “destructive” sampling techniques (i.e., a rake is used to pull the macrophytes lose from the sediments). Because the slender pondweed is considered an RTE species in New York, a nondestructive sampling method is needed. Hence, the selected survey method will primarily focus on the visual determination of the presence or absence of the slender pondweed from Koppers Pond or its outlet channels and whether the habitats are available to support this species.

The survey protocol differs slightly depending on whether the open waters of Koppers Pond or its’ shallow outlet streams are evaluated. A worksheet similar to the NYSCSLAP Aquatic Plant Survey Form (NYCSLAP, 2009) will be used for this survey (Figure 2-1). No effort will be made to quantify species other than the target plant, although general observations concerning the aquatic plants will be made.

2.1 Outline of Survey Method for Koppers Pond

Because Koppers Pond is a small pond, a combined shoreline and limited boat survey will be performed as discussed below.

Shoreline Survey

The shoreline survey will consist of the following.

- A visual survey will be performed by walking along the readily accessible portions of the shoreline, and the adjoining littoral zone will be inspected for the presence of slender pondweed.

- An estimate of the total macrophyte cover in the littoral zone will be made at regularly spaced locations along the readily accessible portions of the shoreline.

- If the slender pondweed is observed, the global positioning system (GPS) coordinates (based on UTM NAD27) of the plant will be collected for subsequent labeling on a U.S. Geological Survey 7.5-minute topographic map or other suitable-scale base map.

- The overall abundance of slender pondweed will be reported based on an ordinal scale (i.e., none, sparse, moderate, or abundant),[1] and its relative abundance to other macrophytes will be determined.

- Digital photographs will be collected to document field observations.

- Field measurements of water temperature and pH will be made at regular intervals (e.g., approximately every 100 yards) or at locations where the slender pondweed is observed or suitable substrate is available.

Open Water Survey

If the reconnaissance along the shoreline suggests some areas within the open water of the pond have macrophyte stands, these areas will be inspected by boat to determine whether

[1] NYSDEC (2006) uses an alternate ordinal scaling (based on the Cornell/US Army Corps Abundance Scale) but this is defined by the relative collections on a sampling rake, which will not be used for this survey.

slender pondweed is present. A determination will be made whether this species is present or suitable substrate is available, following the same approach as taken with the shoreline survey.

2.2 Outline of Survey Method for Outlet Tributaries from Koppers Pond

The survey of the outlet tributaries will consist of the following:

- A visual survey will be performed by walking along the west and east outlets, and outlet channel downstream to sample station 17 (Figure 1-1). A determination will be made whether this species is present or suitable substrate is available, following the same approach as taken with the shoreline survey in Section 2.1.

- Field measurements of water temperature and pH will be made at regular intervals (e.g., every 100 yards) or at locations where the slender pondweed is observed or suitable substrate is available.

2.3 Slender Pondweed Identification and Life History

The slender pondweed is classified as a native, New York State endangered plant, with a state rank of S1 (Weldy and Werier, 2009). The Maine Department of Conservation (MDOC, 2004) provides a comprehensive summary of the slender pondweed identification and habitat preferences (see Appendix A, Attachment A-1). The key identification and habitat information are summarized below:

- A pondweed with floating leaves absent, submersed leaves linear;
- Stipules fused to leaf sheaths for at least 1 centimeter (cm);
- Leaves 0.2 to 0.8 millimeters wide, not lobed at base, tips blunt, obtuse, or notched (rarely apiculate);
- 10 to 30 cm long, with tightly clasping, persistent leaf sheaths;
- Principal habitats are alkaline ponds and stream (pH range of 7.3 to 9.1); open water, non-forested, wetlands; and
- Fruits ripen August to September.

A key for this species (and related *Potamogetonaceae*) is available from Crow and Hellquist (2005), which will be used along with other appropriate identification manuals. Photographs of this species (leaf form and fruit) are provided in Appendix A.

2.4 Slender Pondweed Survey Schedule

The visual survey for the slender pondweed at Koppers Pond will be performed in late August or early September 2009 when the macrophyte fruit (and seeds) are present. The latter will assist in the identification of this species.

3.0 PROPOSED SITE RECONNAISANCE PROTOCOL TO IDENTIFY CANDIDATE REFERENCE PONDS

The use of a reference area can facilitate the interpretation and evaluation of potential risks in an ecological risk assessment. Comparison of the Site to a comparable reference area is critical in the evaluation of the health of certain ecological communities that have been selected as measurement endpoints in the assessment. The selection and use of reference areas can also be critically important when ecologically significant chemicals may be present due to area-wide sources that are not attributable to the Site. For such chemicals, information about their concentrations in reference areas that are separate from Site-related releases can help in the determination of whether concentrations measured at the Site are elevated above background levels.

Ideally, reference sites are selected to be as similar as possible to physical and biological conditions at the site prior to constituent releases so that differences can be attributed to chemical exposure. Both USEPA (1994, 1997, 1998a) and NYSDEC (2002) have relevant guidance concerning the selection of reference (or background) areas, which are discussed below.

3.1 Relevant USEPA Guidance

USEPA's general guidelines for the selection of reference sites, in order of importance, consist of the following (USEPA, 1998b):

- Areas within the same ecoregion;
- Areas with no impoundments on associated streams and rivers;
- Areas with no known discharges or site contaminants;
- Areas with no known spills;
- Areas with low human population density;
- Areas with low agricultural activity;
- Areas with low road and highway density; and
- Areas with minimal non-point source problems.

Additional characteristics of ideal reference sites include (USEPA, 1998b):

- Extensive natural vegetation representative of the region;
- A natural hydrograph;
- Natural color and odor of water on the site; and
- Presence of biota that are representative of the region and derive some support from the aquatic (or wetland) ecosystems.

Generally, a phased approach is employed to identify reference sites, in which increasingly narrower criteria are used to screen numerous potential reference areas until the best available locations are selected. The first phase consisted of a review of aerial photographs and regional maps covering the vicinity of the site to identify potential reference areas based on similarity in size and location in the watershed. For example, the aerial photograph provided in Figure 3-1 shows several candidate ponds that may be considered for the reference pond evaluation.

The second phase in the reference site selection process consists of the preliminary field visits to the candidate sites. The criterion that will be used to preliminarily screen potential sites during site visits is the water regime and environmental setting of the candidate reference ponds. A summary of the potential metrics that will be used for this screening are presented in Table 3-1. This table shows two candidate sites as an example only. The information shown in this table will be completed to the extent possible for all of the candidate reference ponds. Additional metrics may also be identified during the field reconnaissance.

One of the principal objectives of this reconnaissance is to determine candidate pond access issues, which include both the perspective of permission to sample, and the ability to collect the samples (e.g., suitable boat launch locations). Private landowners (or landowner groups) may be reluctant to provide permission to access their ponds. Therefore, a pond that is located on public property may ultimately serve as the reference pond.

3.2 Potentially Relevant NYSDEC Guidance

Section 3.6.1(a)(3) of NYSDEC (2002) summarizes recommendations for identifying background (reference) locations for soil collections. Although originally developed for soil sampling, several of these components are relevant to the identification of a suitable reference pond. These include the following elements:

1. A minimum of five background samples should be collected from unimpacted areas from the reference site. The sample should be collected from a depth which conforms to the same depths sampled during the site investigation. Because the reference pond results will be primarily used to support the ERA, the sediment sample depths will be the shallow (0- to 6-inch) depth interval.

2. Background samples should be collected at locations unaffected by current and historic site operations as documented by the records search including aerial photographs. Wherever possible, background samples should be collected from locations that are topographically upgradient and upwind of contaminant sources.

3. Background samples should not be collected from the following areas:

    a) Parking lots, roads, or roadside areas;

b) Areas where materials or wastes were loaded, handled, or stored;
c) Waste disposal areas;
d) Areas near railroad tracks;
e) Areas of historic fill material;
f) Areas receiving runoff from the preceding five areas or adjacent sites;
g) Storm drains or ditches receiving runoff from the site or adjacent sites;
h) Depositional areas from point sources; or
i) Any other area of concern.

Reference site reconnaissance and selection will be performed in the early fall of 2009, with the anticipated participation of personnel from the oversight agencies (USEPA, USFWS and/or NYSDEC). The reference site(s) will be identified and a sampling program developed as part of the ERAGS Step 3 through 5 document. There is the possibility that some of the proposed samples may not be collected due to existing conditions at the reference site(s) (e.g., poor sediment recoveries due to substrate conditions).

3.3 Field Reconnaissance for Candidate Reference Ponds

The field reconnaissance to support the identification of candidate reference ponds near the site will be performed concurrent with the field survey for the slender pondweed (i.e., late August or early September 2009).

4.0 REFERENCES

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Figures

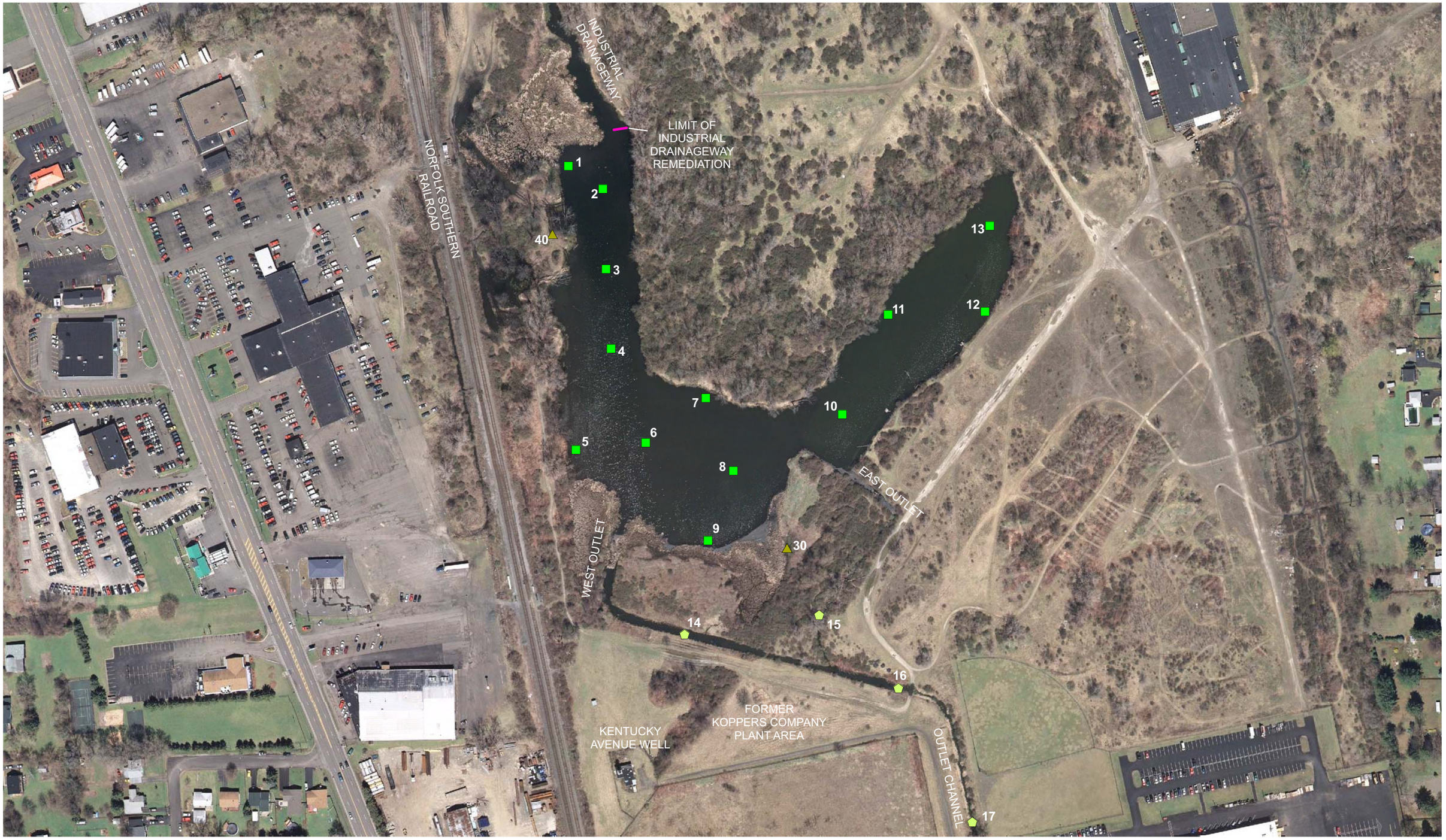

Figure 1-1. Sampling Locations from Koppers Pond and Outlets
Kentucky Avenue Wellfield Site - OU4
Horseheads, New York

Example CSLAP Aquatic Plant Survey Form

Lake Name	Pennant Lake					Start Time:			12:30			Description Starting Point:					Jones Dock						Station	
Sampling Date:			6/31/08			End Time:			13:30			Lat:	42.7825				Long:		-74.2554				Description	
						Exotics/Target Plants:						Native and Other Plants:													
Station#	Sample#	Lat	Long	Depth (m)	Overall Plant Abundance	Eurasian watermilfoil (=E1)	water chestnut (=E2)	curly leafed pondweed (=E3)	fanwort (=E4)	Other Target: (=E5)	Other Target: (=E6)	Other Target: (=E7)	Coontail (=N1)	White water lily (=N2)	Plant 3 (= N3)	Plant 4 (=N4)	Plant 5 (=N5)								
1	1	43.782781	-74.255430	1	M	T		T					M											Hamels
2	1	43.788939	-74.257232	1.5	D		M							D										Howard
3	1	43.786458	-74.257202	0.5	D	D							M		S									Utley
4	1	43.791360	-74.153010	3	S										S									Rollins
5	1	43.792960	-74.249730	1	T	T										T								Feliz
6	1	43.794020	-74.254760	1.5	M		S										M							Burrell
7	1	43.791656	-74.261278	2	M			T								M								Victorino
8	1	43.791981	-74.265915	0.5	Z																			Werth
9	1	43.788530	-74.268680	2	T	T											T							Stairs
10	1	43.786980	-74.262510	3	Z																			N wetland
11	1	43.783810	-74.258520	0.5	S	S							S	S										Lidge
12	1																							
13	1																							
14	1																							
15	1																							
16	1																							
17	1																							
18	1																							
19	1																							
20	1																							

Abundance Values: Z = Zero; T = Trace (fingerful); S = Sparse (handful), M = Moderate (rakeful); D = Dense (too much to bring in boat)

Additional Comments:	North end of lake sampled- south end will be sampled next month
	Native plants #3 through #5 and all exotic plants submitted for identification
	Station description – resident of closest house to site

Figure 2-1. Example Survey Worksheet (NYCSLAP, 2009)

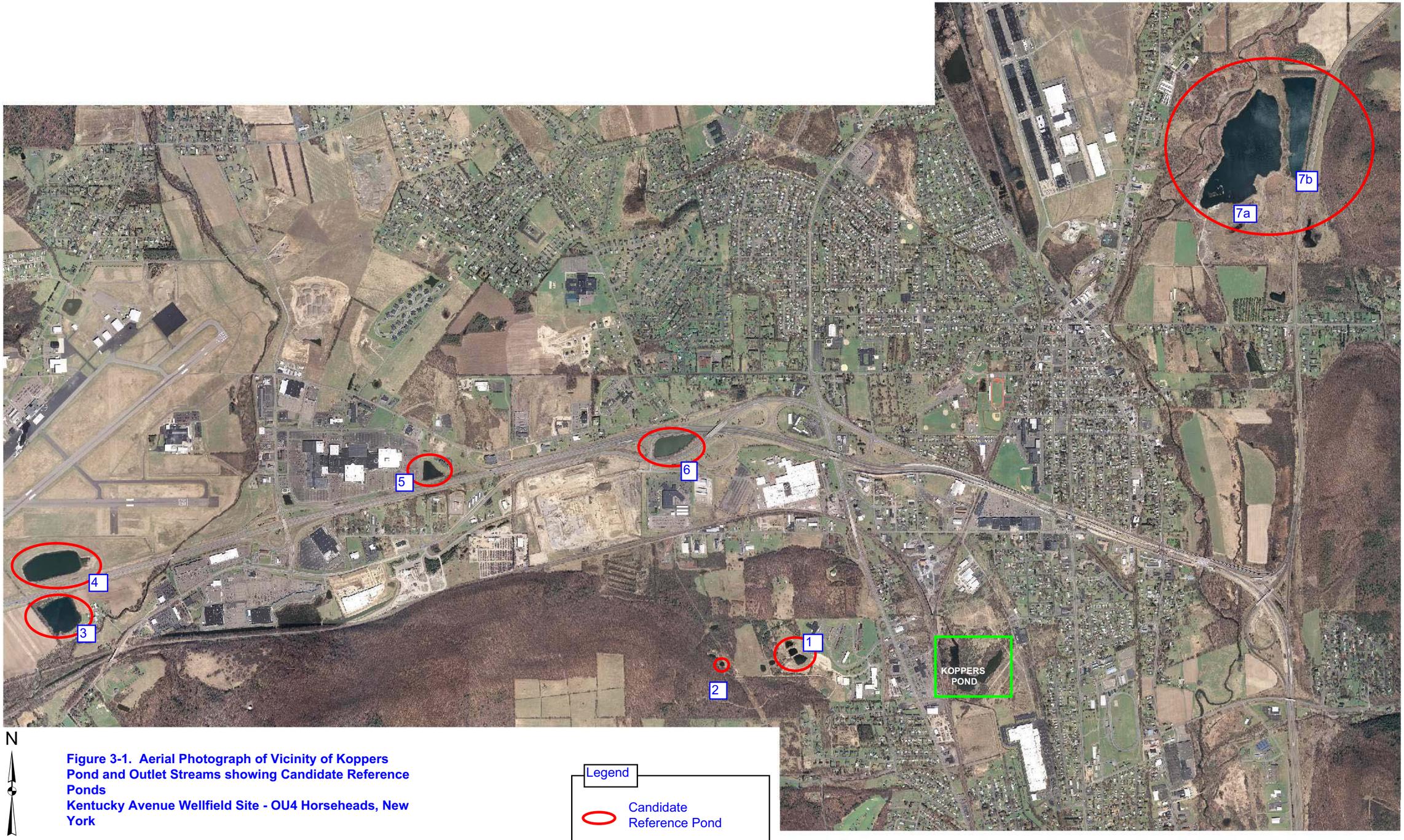

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Figure 3-1. Aerial Photograph of Vicinity of Koppers Pond and Outlet Streams showing Candidate Reference Ponds
Kentucky Avenue Wellfield Site - OU4 Horseheads, New York

Legend
- Candidate Reference Pond
- Koppers Pond

0 900 1,800 3,600 Feet

Prepared For:
KOPPERS POND RI/FS GROUP

CUMMINGS RITER CONSULTANTS, INC

hheads-refpond.mxd

Tables

Table 3-1. Example of Key Comparison Metrics for Selection of Reference Pond Site
Kentucky Avenue Wellfield OU4 - Koppers Pond, Horseheads, NY

Location	Koppers Pond	Candidate Reference Sites			Comment
		1	2	(etc)	
Distance from site (ft)					
Size (acres)					
Elevation (ft ASL)					
Inlet (Y/N)					
Outlet (Y/N)					
Etiology (if known)					Natural, man-made (e.g., farm pond, former detention pond, etc.)
Water depth range (ft)					
Sediment substrate					Visual evaluation.
Percent open water					
Same watershed as site (Y/N)					
Adjoining land use					Area immediately adjoining the candidate pond.
- Dominant canopy species					
- Degree of canopy closure (%)					
- Dominant shrub species					
- Degree of shrub canopy (%)					
- Dominant ground cover					
- Percent ground cover					
- Soil type					
Proximity to known sources (Y/N)					
Known inputs (e.g., culverts, CSOs)					
Adjoining roadways/type					Specify whether adjoining to pond or inlet(s) to pond.
Adjoining railways (Y/N)					
Evidence of aquatic life (Y/N)					
Existing chemistry data (if known)					
Ownership					Private (residential or commercial), state-owned, PRP-owned, etc.
Access issues					Includes issues related to (1) securing permission to sample, and (2) ability to collect samples.
Existing chemistry data (if known)					

Note:
Additional metrics may be developed during the field reconnaissance.
Two candidate sites are shown as an example only. Additional sites will be added during the field reconnaissance.
This matrix will be completed to the extent possible for all of the candidate reference ponds.

Appendix A
Slender Pondweed Supporting Information

APPENDIX A
SLENDER PONDWEED SUPPORTING INFORMATION

Preface

This appendix provides photographs of the slender pondweed (*Stuckenia filiformis alpinus*), and a summary of its life history, to assist in its identification in the field.

Photographs of Slender Pondweed

Photo 1. Plants in habitat

Photographs of Slender Pondweed

Photo 2. Plants showing fruit.

Photographs of Slender Pondweed

Photo 3. Close-up view of fruit.

Note:

All photographs were from "*A Digital Flora of Newfoundland and Labrador Vascular Plants, Potamogetonaceae: Pond Weed Family*"

[http://www.digitalnaturalhistory.com/flora_potamogetonaceae_index.htm#stuckeniafiliformisalpina]

Maine Department of Conservation
Natural Areas Program

Stuckenia filiformis Pers. **ssp** ***alpinus*** (Blytt) Hayner, Les & Kral

Northern Slender Pondweed

Habitat: Alkaline ponds and stream. [Open water (non-forested, wetland)]

Range: Greenland to Alaska, south to northern New England, New York, and west to Utah (ssp. *alpinus*).

Phenology: A perennial; fruits (often helpful for identification) ripen in August - September.

Family: Potamogetonaceae

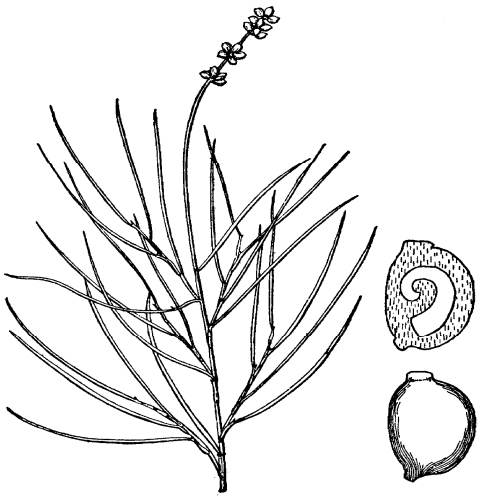


Illustration from Britton & Brown's Illustrated Flora of the Northern United States and Canada, 2nd ed.

Aids to Identification: A pondweed with floating leaves absent, submersed leaves linear; stipules fused to leaf sheaths for at least 1 cm; leaves 0.2-0.8 mm wide, not lobed at base, tips blunt, obtuse, or notched (rarely apiculate). *P. filiformis* var. *alpinus* is 10-30 cm long, with tightly clasping, persistent leaf sheaths.

Ecological characteristics: In Maine, this species is mostly restricted to a few marl ponds of Aroostook county. Marl ponds are themselves rare in Maine. Sites where these plants have been found range in pH from 7.3 to 9.1. The variety *occidentalis* is far rarer than the variety *alpinus*.

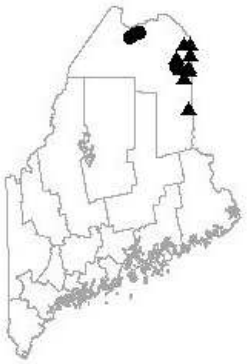
Synonyms: Formerly known as *Potamogeton filiformis* var. *alpinus*.

Rarity of *Stuckenia filiformis* ssp *alpinus*

State Rank:	S1	Critically imperiled in Maine because of extreme rarity or vulnerability to extirpation.
New England Rank:	Division 2	Regionally rare plant: Fewer than 20 current (seen since 1970) occurrences within New England.
Global Rank:	G5T5	Species and subspecies both demonstrably widespread, abundant, and secure globally.

Status of *Stuckenia filiformis* ssp *alpinus*

Federal Status:	None	No Federal Status.
State Status:	Special Concern	Rare in Maine, but not sufficiently rare to be considered Threatened or Endangered.



▲ Historical (before 1982)
● Recent (1982 - present)

Known Distribution in Maine:

This rare plant has been documented from a total of 12 town(s) in the following county(ies): Aroostook.

Dates of documented observations are: 1940 (2), 1972 (2), 1973 (2), 1979 (4), 1998, 1999 (2), 2002

Reason(s) for rarity:

Southern limit of range, suitable habitat naturally scarce.

Conservation considerations:

Maintain hydrologic integrity of its alkaline water habitat.

The information in this fact sheet was downloaded from the Natural Areas Program's Biological and Conservation Database on 17 MAY 2004. We are grateful to our Botanical Advisory Group for additional information on particular species, and in particular, to Arthur Haines for his assistance with identifying characteristics and taxonomic questions. Nomenclature follows Haines and Vining's *Flora of Maine* (V.F. Thomas Press, 1998); where older works refer to a plant by another name, it is given under "Synonyms". The Natural Areas Program, within the Department of Conservation, maintains the most comprehensive source of information on Maine's rare or endangered plants and rare or exemplary natural communities, and is a member of the Association for Biodiversity Information.

If you know of locations for this plant or would like more information on this species,
please contact the Natural Areas Program
State House Station 93, Augusta, Maine 04333; telephone (207) 287-8044.

DEPARTMENT OF CONSERVATION
MAINE