

**Investigation of the Aquatic
Communities of the Salmon Trout
River, Yellow Dog River, and Cedar
Creek in Marquette County,
Michigan.**

April 5, 2007

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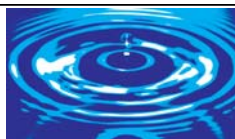


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1.0 SUMMARY

Advanced Ecological Management (AEM) conducted a follow-up aquatics survey in June, 2006 at the Eagle Project site for use by Kennecott Eagle Minerals Company (KEMC). KEMC is planning to develop mining facilities at the site. Previous aquatics surveys have been conducted in the area, some within several of the same stations as this survey. The nine stations included in this survey were located on the Salmon Trout River, the Yellow Dog River, and Cedar Creek. Where applicable, the aquatics surveys at the stations included fish, macroinvertebrate, and habitat community ratings according to the metrics outlined in the Great Lakes and Environmental Assessment Section (GLEAS) Procedure Number 51 (P-51), a survey protocol for wadable streams and rivers.

Fish were collected from eight of nine stations that were evaluated for this survey. No fish were collected from Station 8 located in the East Branch of the Salmon Trout River. The most fish were collected from Station 6, which is located in the vicinity of the ore body in the Salmon Trout River. Brook stickleback (*Culaea inconstans*) and northern redbelly dace (*Phoxinus eos*) were the most abundant species in Station 6.

The aquatic systems investigated for this survey are predominantly functioning as coldwater trout streams. Because some of the fish communities of the Salmon Trout River, Yellow Dog River, and Cedar Creek were comprised of trout greater than 1% of the fish community composition, the P-51 fish community scores were determined from the macroinvertebrate community ratings for those streams.

The macroinvertebrate communities within the Salmon Trout River have been scored by AEM as excellent or acceptable communities. In most stations, the macroinvertebrate community rating was consistent with previous sampling efforts conducted by Wetland and Coastal Resources and the MDEQ (WCR 2005; MDEQ/ Premo et al., 2005, 2006).

The aquatic habitat was rated as excellent or good by AEM. The 2006 aquatic habitat scores are generally consistent with previous evaluations that were conducted by WCR and the MDEQ, (WCR, 2005; MDEQ/Premo et al., 2005, 2006).

A summary of P-51 macroinvertebrate and aquatic habitat scores appears on Table 1-1.

2.0 INTRODUCTION

Kennecott Eagle Minerals Company (KEMC) has applied for a permit from the Michigan Department of Environmental Quality (MDEQ) to mine ore from an ore body located on the Yellow Dog Plains near the Main Branch of the Salmon Trout River (Figure 2-1). As part of a pre-mining environmental baseline, aquatic community investigations have been conducted within the Salmon Trout River, Yellow Dog River, and Cedar Creek. These studies have been completed by Wetland and Coastal Resources (WCR, 2005), King & MacGregor Environmental (KME, 2005), and the Michigan Department of Environmental Quality (MDEQ/Premo et al., 2005, 2006).

R. Douglas Workman, Ph.D. of Advanced Ecological Management, LLC (AEM) was contracted with Foth Infrastructure & Environment to conduct for KEMC continued aquatic community sampling at the Eagle site. Dr. Workman also conducted the 2005 survey for KME.

3.0 STUDY AREA

The principle area investigated for this study included portions of the Salmon Trout River, the Yellow Dog River, and Cedar Creek (Figure 2-1). These systems are all coldwater streams that flow through relatively undeveloped watersheds that are predominantly forested. The ore body and proposed mine site are located near the headwaters of the Salmon Trout River Main Branch, which flows in a northeastern direction. The Salmon Trout River is characterized by a variety of habitat types in the vicinity of the sites that were investigated for this study and includes slow-flowing segments with a silt substrate that have been heavily influenced by beaver activity, and high-gradient segments flowing through forested and hilly terrain.

The Yellow Dog River flows to the east along the southern boundary of the Yellow Dog Plains (Figure 2-1). Cedar Creek flows to the north and is not located within the same watershed as the proposed mining project and serves as a reference stream for the Eagle Project.

4.0 METHODS

The 2006 aquatic survey was conducted according to the Michigan Department of Environmental Quality's Surface Water Quality Division *Procedure #51 Survey Protocols for Wadable Rivers* (MDEQ, 2002), also known as "P-51". Nine stream segments (stations) were sampled and are shown on Figures 4-1, 4-2 and 4-3. These sample stations are at approximately the same sample locations that were surveyed by Wetland Coastal Resources (WCR, 2005), the Michigan

Department of Environmental Quality, (MDEQ/Premo et al., 2005), and King-MacGregor Environmental, (KME, 2005). WCR had previously surveyed Stations 1 through 5; the KME survey addressed Stations 6, and 7; and MDEQ had previously surveyed Station 9. Station 8 was added to provide an additional survey point on the East Branch of the Salmon Trout River.

This report follows the protocol established in the Wetland & Coastal Resources survey of 2004, (WCR, 2005) in that fish collection data are summarized and Procedure #51 scores are provided for macroinvertebrates and habitat quality.

4.1 Fish Collection

Stations were blocked at the upstream and downstream extents using seines that measured 4 feet by 50 feet, with a 0.19-inch mesh size. When adequate habitat conditions permitted, a multi-pass removal technique was used to evaluate fish abundance throughout each station (Van Deventer and Platts, 1983). A backpack electroshocker was used in narrow (approximately ≤ 10 feet) or difficult-to-access stations (e.g., areas with abundant woody debris). A barge-mounted electroshocker was used to sample stations that were deeper (approximately 2 to 3 feet), wider (approximately > 10 feet), and where woody debris was sparse enough to permit the passage of the barge unit. Three consecutive passes were conducted, each in an upstream direction. The duration of electroshocking was recorded for each pass and stunned fish were placed in a live well for identification and enumeration. Following each pass and subsequent fish identification, the enumerated fish were released approximately 100 feet upstream of the station so that they would not be re-collected in subsequent passes.

As part of the enumeration process the number of each species present was recorded. One representative of each species that was not identifiable in the field was placed in a voucher jar containing 10% formalin for later identification. Each voucher jar was labeled according to the sample location and date. Fish were identified to species using various taxonomic references (Eddy and Underhill, 1978; Becker, 1983; Page and Burr, 1991; Coon, 2001; Pflieger, 1997; McCafferty, 1997). The Michigan County Element List (MNFI, 2006) was also reviewed to determine if any threatened, endangered, or special concern aquatic species were known to occur within the Salmon Trout River, the Yellow Dog River, or Cedar Creek.

4.2 Macroinvertebrates

Upon completion of fish sampling, aquatic macroinvertebrates, including mussels and decapods (crayfish), were collected within each station using D-framed kick-nets (Merritt et al., 1996).

Stations were sampled for 45 minutes using two kick nets (total sample time = 1.5 hours) and samples were collected in all habitat types within each station to characterize the macroinvertebrate community. Collected specimens were stored in 500 ml plastic wide-mouth jars containing 70% ethanol, and were identified using various taxonomic references (Merritt and Cummins, 1996; Pennak, 1990; Peckarsky et al., 1990; Cummings and Mayer, 1992).

The macroinvertebrate data were analyzed according to nine metrics identified in the P-51 methodology. The sum of the macroinvertebrate scores can range from -9 to +9; and are graded as excellent, acceptable, or poor according to the summation of the metric scores.

4.3 Stream Habitat Evaluation

Riparian and instream habitats were qualitatively described for each station. A description of stream morphology included run/riffle/pool/shallow pool configurations, substrate, substrate embeddedness, instream cover, vegetation, flow stability, and bank stability. Stream habitat was rated as excellent, good, marginal, or poor based on P-51 scores interpreted from 10 habitat metrics. Habitat was rated according to the following P-51 habitat scores (MDEQ, 2002):

Habitat Characterization	Total Point Score
1. Excellent	> 154
2. Good	105 – 154
3. Marginal	56 – 104
4. Poor	< 56

Photographs were taken at each station to illustrate the conditions during the sampling period. Water temperature, pH, dissolved oxygen, and conductivity were measured as part of the stream habitat evaluation. These water quality parameters were measured using a Yellow Springs Instrument Model YSI 556 water quality meter.

5.0 RESULTS AND DISCUSSION

Aquatic community sampling was conducted by AEM from June 10, 2006 through June 13, 2006 within the Salmon Trout River, the Yellow Dog River, and Cedar Creek. A total of nine stations were sampled, including one station in the Yellow Dog River, one station in Cedar Creek, and seven stations in the Salmon Trout River (Table 5-1 and Figure 4-1, 4-2, and 4-3).

5.1 Fish

Fish were collected from all stations except for Station 8. A total of six species of fish were observed among all nine stations (Table 5-2).

No MNFI listed threatened or endangered fish species were identified in the stations investigated in the Salmon Trout River, Yellow Dog River, and Cedar Creek in Marquette County, Michigan.

5.1.1 Salmon Trout River: Stations 1, 2, 3, 6, 7, 8, and 9

Northern redbelly dace (*Phoxinus eos*), brook stickleback (*Culaea inconstans*), and brook trout (*Salvelinus fontinalis*), were the most frequently observed species among all seven stations within the Salmon Trout River (Table 5-2). Brook trout were observed within stations 1, 2, 3, and 6 during June 2006.

Brook trout were the only species collected in Stations 1, 2, and 3. The number of brook trout collected from Stations 1, 2, 3, and 6 ranged from three to four fish.

A total of 475 fish were collected from Station 6 by AEM in 2006 (Table 5-2). The fish from this station were predominantly northern redbelly dace and brook sticklebacks. Three brook trout were also collected from Station 6.

Only one specimen, a brook stickleback, was collected by AEM in Station 7. Because habitat conditions from beaver activity made it difficult to adequately block the stream, a multi-pass removal method was not possible within this station.

No fish were collected from Station 8 and only one specimen, a slimy sculpin (*Cottus cognatus*) was collected from Station 9 within the East Branch of the Salmon Trout River (Table 5-2). A multi-pass removal was not possible within Station 8 because of a high stream gradient and numerous boulders located throughout the station, which prevented adequate blocking of the station extents.

5.1.2 Yellow Dog River: Station 5

Station 5 is located in the Yellow Dog River. A total of eighteen fish were collected in Station 5, including thirteen blacknose dace (*Rhinichthys atratulus*), three creek chubs (*Semotilus atromaculatus*), one slimy sculpin, and one brook trout (Table 5-2).

5.1.3 Cedar Creek: Station 4

Station 4 is located in Cedar Creek outside of the project area drainage basin. A total of 39 brook trout and one brook stickleback were collected in Station 4 (Table 5-2).

5.2 Macroinvertebrates

Macroinvertebrates were collected from all nine stations that were investigated in 2006. Because of beaver dams in the vicinity of Station 6 and Station 7 (Figure 4-1), the P-51 protocol for scoring macroinvertebrates was not applicable in these locations.

5.2.1 Salmon Trout River: Stations 1, 2, 3, 6, 7, 8, and 9

A total of 41 taxa identified to the Family level were observed collectively from Stations 1, 2, 3, 6, 7, 8, and 9 in the Salmon Trout River. The greatest number of macroinvertebrates were collected from Station 8 and the fewest number of macroinvertebrates were collected from Station 9 (Table 5-3).

Mayflies (Ephemeroptera) were the most frequently collected macroinvertebrates followed by caddisflies (Trichoptera) in Station 1 (Table 5-3). A total of 55 macroinvertebrates were collected from Station 2 with flies (Diptera) and mayflies being the most frequently collected macroinvertebrates in this station.

A total of 136 macroinvertebrates were collected from Station 3 with flies and caddisflies being the most frequently collected macroinvertebrates (Table 5-3). A total of 121 macroinvertebrates were collected from Station 6 (Table 5-3). Scuds (amphipods), dragonflies (anisoptera), and truebugs (hemipterans) were the most frequently collected macroinvertebrates from this station.

A total of 75 macroinvertebrates were collected from Station 7 in 2006 (Table 5-3). Similar to Station 6, scuds were the most frequently collected organisms in Station 7. Flies and mayflies were the most frequently collected macroinvertebrates in Station 8 and Station 9 (Table 5-3).

Where possible, macroinvertebrate collection data have been evaluated in accordance with the metrics outlined in P-51. Table 5-4a summarizes the values and scores for the nine metrics for each station. Station 1 was rated as “Excellent” with Stations 2, 3, 8, and 9 rated as “Acceptable”.

5.2.2 Yellow Dog River: Station 5

A total of 66 macroinvertebrates representing nineteen taxa identified to the Family level were collected in Station 5 from the Yellow Dog River (Table 5-3). Mayflies and dragonflies were the most frequently collected macroinvertebrates. Table 5-4b shows the metrics values, scores, and rating of Station 5 as “Acceptable”.

5.2.3 Cedar Creek: Station 4

A total of 131 macroinvertebrates representing 21 taxa identified to the Family level were collected from Cedar Creek in Station 4 during 2006 (Table 5-3). Mayflies and caddisflies were the most frequently collected macroinvertebrates. Table 5-4b shows the metrics values, scores, and rating of Station 4 as “Excellent”.

5.3 Stream Habitat

The stream habitat within Stations 1, 2, 3, 4, and 5 was consistent with conditions observed by the WCR survey (WCR, 2005), and MDEQ, (MDEQ/Premo et al. 2005). The habitat conditions for all stations surveyed are described below.

5.3.1 Salmon Trout River: Stations 1, 2, 3, 6, 7, 8, and 9

Station 1 is located in a narrow valley with relatively steep slopes rising more than 100 feet to the Yellow Dog Plains. Station 1 was 120 feet in length with an average width of 8.3 feet. The streambanks were vegetated with herbaceous and woody vegetation (Photograph C-1). The streambed is characterized by a relatively steep gradient and the substrate was comprised of a variety of particles including sand, gravel, cobble, and boulders. Woody debris was frequently observed throughout the station (Photograph C-2).

Stations 2 and 3 are located immediately downstream and upstream of Triple A Road (Figure 4-1). Station 2 was 100 feet in length with an average width of 5.7 feet, and Station 3 was 200 feet in length with an average width of 7.9 feet.

Station 2 was surrounded by an abundance of speckled alder (*Alnus rugosa*) and bluejoint grass (*Calamagrostis canadensis*, Photographs C-3 and C-4). The vegetation within Station 3 was predominantly characterized as speckled alder, which contributed woody debris to the stream

(Photographs C-5). Watercress (*Nasturtium* sp.) was present within the stream channel of Station 3 (Photographs C-6).

Station 6 is located in the vicinity of the ore body (Figure 4-1). Station 6 is 300 feet in length with an average width of 21.0 feet, and was influenced by beaver dams that were located downstream of the station. The streambanks are characterized by sedge (*Carex* sp.), iris (*Iris* sp.), rush (*Juncus* sp.), willows (*Salix* sp.) and speckled alder (Photograph C-7). Much of the aquatic vegetation was growing on relatively unconsolidated organic matter that appeared to function as a floating mat of vegetation and organic matter when traveled upon by foot traffic.

The substrate of Station 6 was predominantly comprised of organic matter and fine sediments, such as silt and clay. Large woody debris was present throughout the stream channel.

Station 7 is located near the headwaters of the Salmon Trout River and is influenced by beaver dams throughout the vicinity. Station 7 is 100 feet in length with an average width of 5.3 feet. An active beaver dam is located at the upstream extent of this station.

The streambanks of Station 7 were vegetated with speckled alder, sedge, rush, and iris (Photographs C-8 and C-9). The substrate was comprised of organic matter and silt. Woody debris was abundant throughout this station.

Station 8 is located in the East Branch of the Salmon Trout River immediately upstream of a waterfall that is approximately 12 feet in height. Station 8 was 300 feet in length with an average width of 23.4 feet.

Station 8 is characterized by a high gradient channel with a substrate predominantly comprised of bedrock, boulders, cobble, and some sand and gravel (Photographs C-10). The streambanks are lined with woody vegetation including speckled alder and black spruce (*Picea mariana*), northern white cedar (*Thuja occidentalis*), and balsam fir (*Abies balsamea*), which contribute woody debris to the stream (Photographs C-11).

Station 9 is located approximately 1,680 feet upstream of Station 8 above the confluence of an un-named tributary (Figure 4-1). Station 9 is 200 feet in length and was confined at the upstream extent by a large tree laying across the river channel and contributing to habitat structure within this station. The average width of Station 9 is 15.4 feet.

There was evidence of historic beaver activity near the vicinity of Station 9. Inactive beaver lodges and remnant non-functioning dams were present downstream and upstream of the station (Figure 5-13).

The streambanks throughout Station 9 were partially vegetated and rose approximately 3 to 4 feet above the water surface. The streambanks were vegetated with speckled alder, bluejoint grass, and other herbaceous vegetation (Photographs C-12 and C-13).

The substrate of Station 9 was predominantly comprised of sand and silt. Woody debris was also present throughout this station.

5.3.2 Yellow Dog River: Station 5

The aquatic habitat within Station 5 was consistent with descriptions provided from previous sampling efforts by WCR and the MDEQ. Station 5 was 300 feet in length with an average width of 16.6 feet. The streambanks were vegetated with a dense covering of speckled alder, which contributed to instream cover and woody debris within the channel (Photographs C-14 and C-15). The substrate was predominantly comprised of sand and silt.

5.3.3 Cedar Creek: Station 4

The aquatic habitat within Station 4 was consistent with previous descriptions provided by WCR and the MDEQ (WCR, 2005; MDEQ/Premo, 2005). Station 4 was 300 feet in length with an average width of 16.8 feet. The downstream extent of Station 4 was located approximately 117 feet upstream of Northwestern Road (Figure 4-1).

The riparian vegetation throughout much of the station was predominantly speckled alder (Photograph C-16). Herbaceous vegetation was more abundant near the upstream and downstream extents of the station. A remnant beaver dam was located near the upstream extent of the station and did not appear to impound water (Photograph C-17).

5.3.4 Procedure 51 Habitat Scores

The stations that were sampled in 2006 were rated as good or excellent habitat quality (Table 5-5). The 2006 habitat ratings were generally consistent with previous sampling efforts by WCR and the MDEQ (WCR, 2005; MDEQ/Premo, 2005, 2006).

The stations that were rated as good by AEM (Station 5 and Station 9) were rated on the high end of good. All of the locations investigated by AEM were relatively undisturbed in the immediate vicinity of each station and contributed to the habitat diversity of their respective river system.

5.3.5 Water Quality

Water temperature ranged from 10.2° C in Station 9 to 18.5° C in Station 6 during June 2006 (Table 5-6). The average pH was 6.9 and varied little among stations (standard deviation = 0.6). Conductivity was low in most stations except for Stations 4, 8, and 9 where the conductivity was greater than 100 microSiemens per cm ($\mu\text{S}/\text{cm}$). Dissolved oxygen levels as observed in June 2006 were consistent with flowing stream environments and were sufficient to support aquatic organisms. However, the dissolved oxygen level was relatively low in Station 7 where only one brook stickleback and 75 macroinvertebrates were collected.

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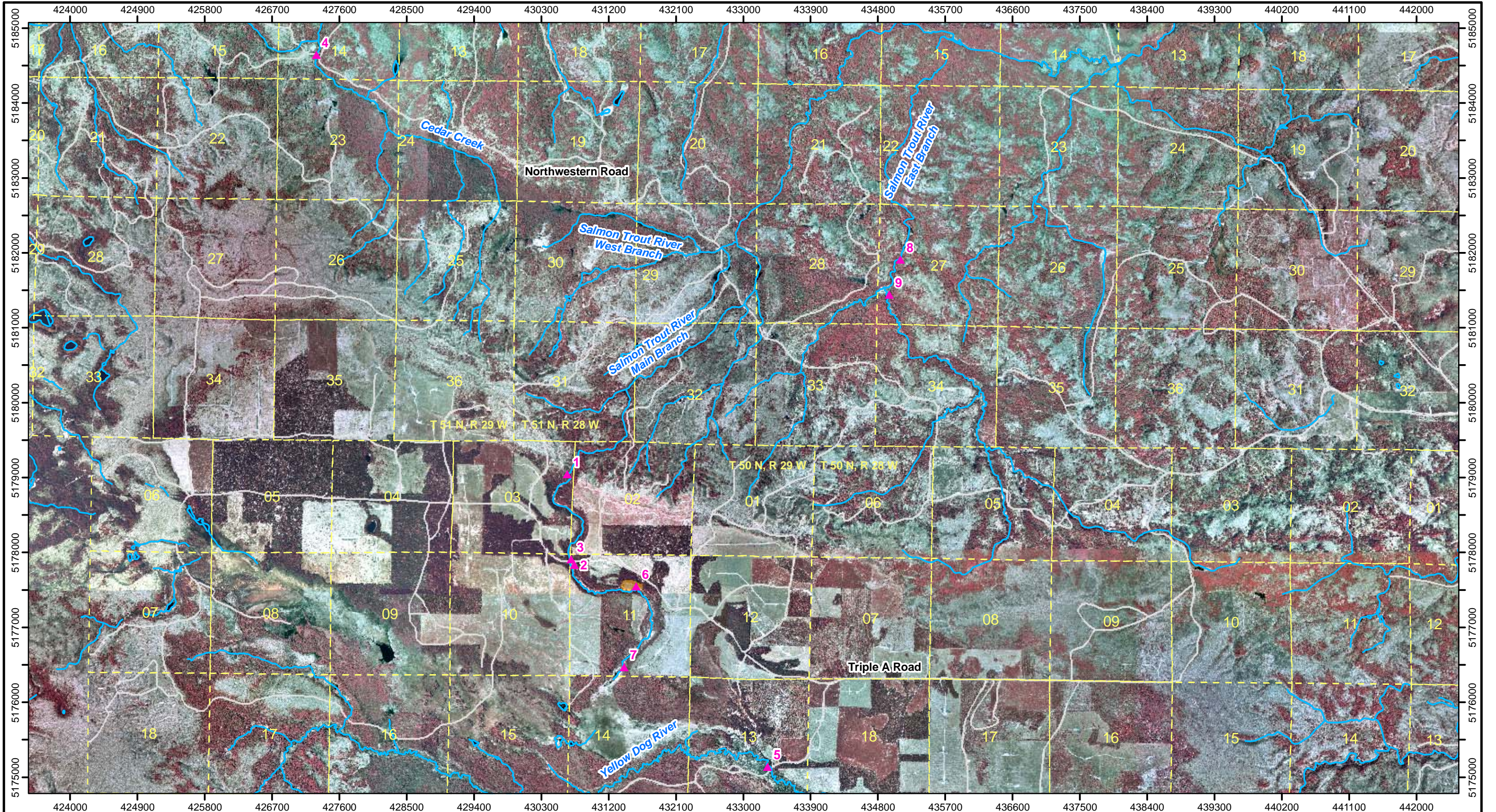
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EXHIBIT A

REPORT FIGURES



NOTES

1. Surface Property Boundary, Ore Body, and Orthophotography supplied by Kennecott via Golder Associates Inc., August, 2005.

2. Horizontal datum based on NAD 83/94.
Horizontal coordinates based on UTM Zone 16.

3. Site Location - Project Site within Sections 11 & 12, T50N, R29W, Town of Michigamme, Marquette County, Michigan.

LEGEND

6 ▲ Aquatic Sampling Location and Number

— River

■ Ore Body



Foth Infrastructure & Environment, LLC			
REVISED	DATE	BY	DESCRIPTION
CHECKED BY:		AKM	DATE: APR. '07
APPROVED BY:		SVD1	DATE: APR. '07
APPROVED BY:			DATE:

FIGURE 2-1

KENNECOTT EAGLE PROJECT

GENERAL SITE LOCATION

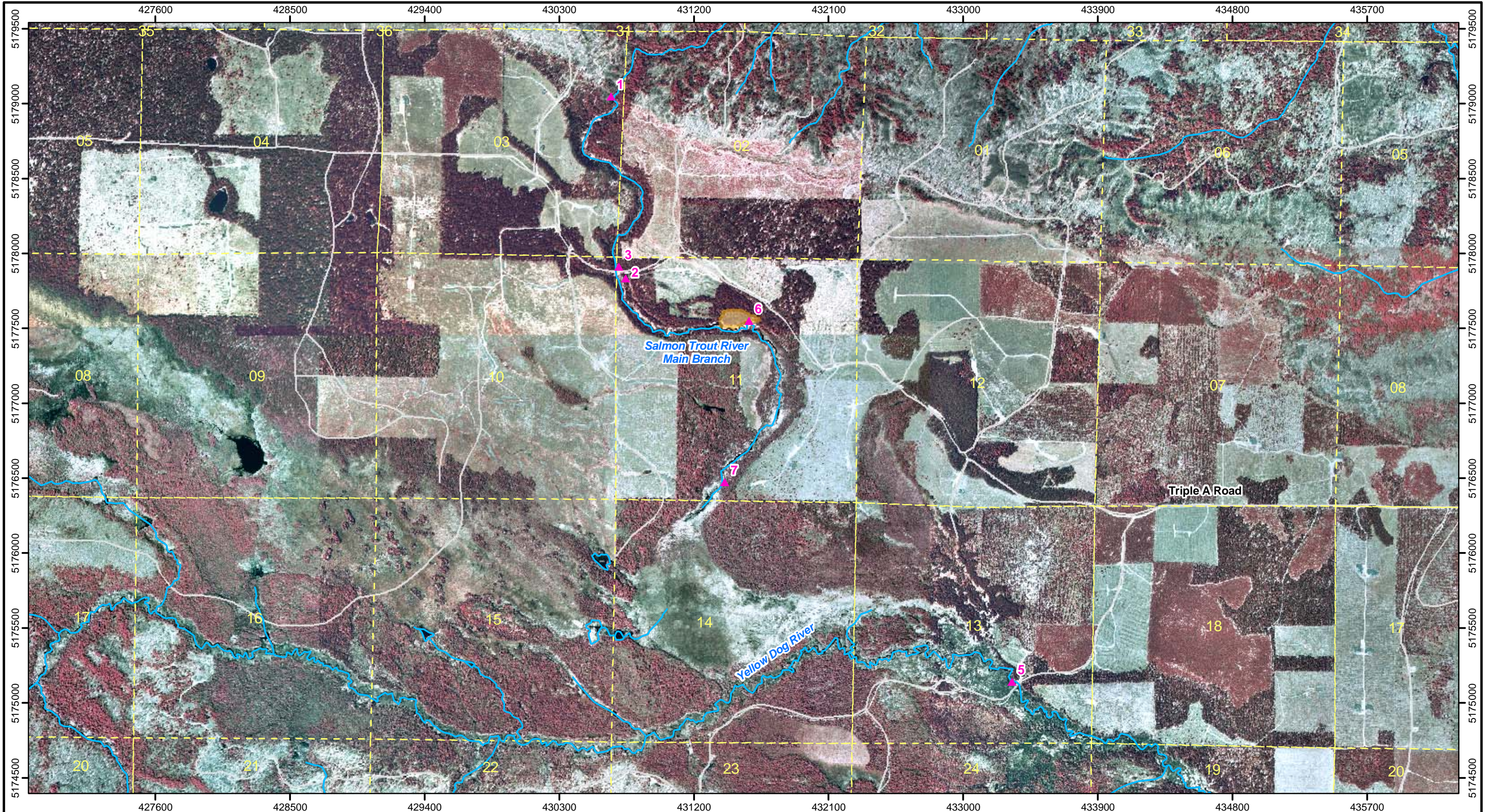
OVERALL SAMPLING LOCATIONS

Scale: 0 300 600 Meters

Prepared by: PEP1

Date: APRIL, 2007

Scope: 04W018



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LEGEND

- 6 ▲ Aquatic Sampling Location and Number
- River
- Orange Box Ore Body

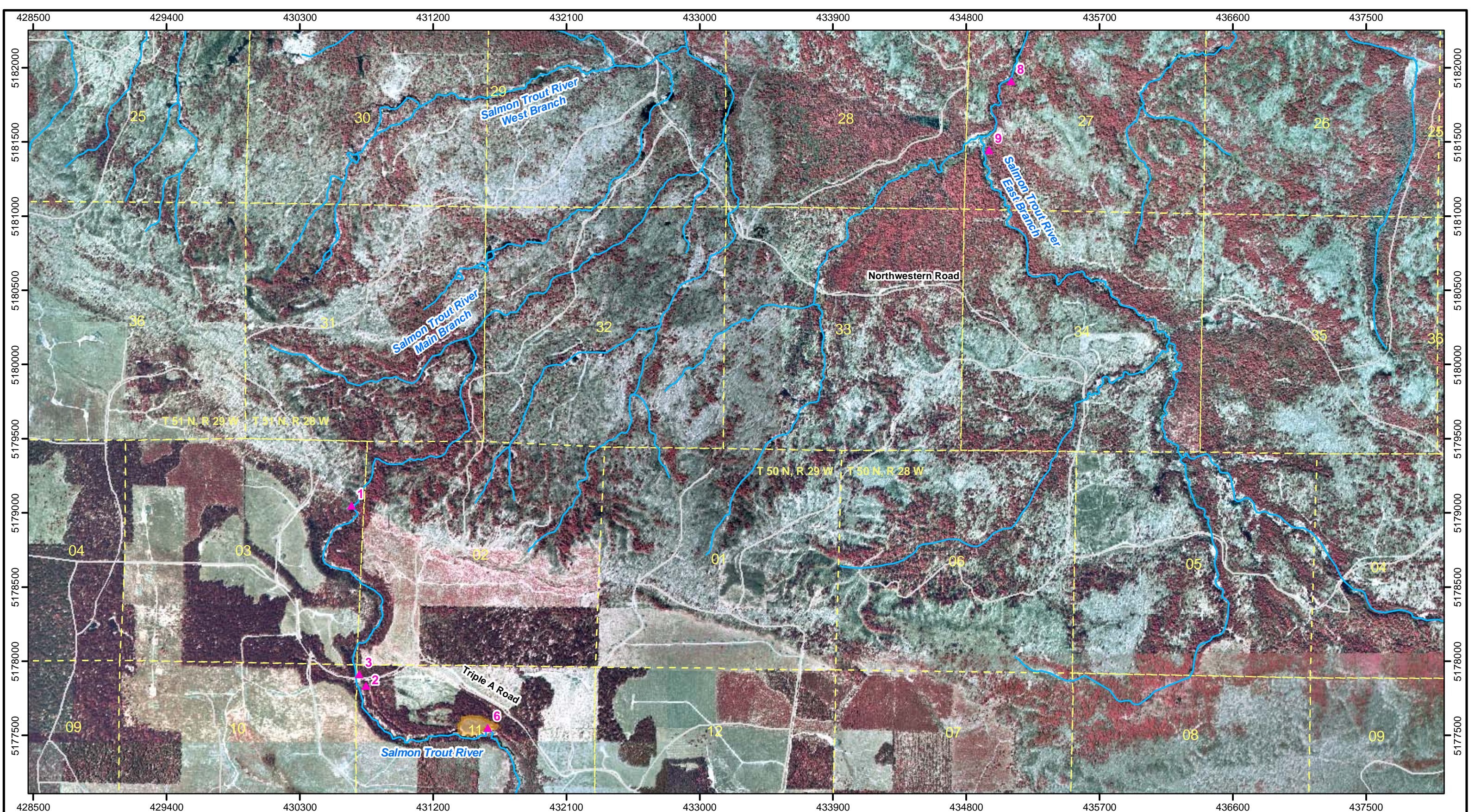


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FIGURE 4-1
SAMPLE STATION LOCATIONS
- CENTRAL DETAIL

Scale: 0 300 600 Meters	Date: APRIL, 2007
Prepared by: PEP1	Scope: 04W018



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LEGEND

- 6 ▲ Aquatic Sampling Location and Number
- River
- Ore Body

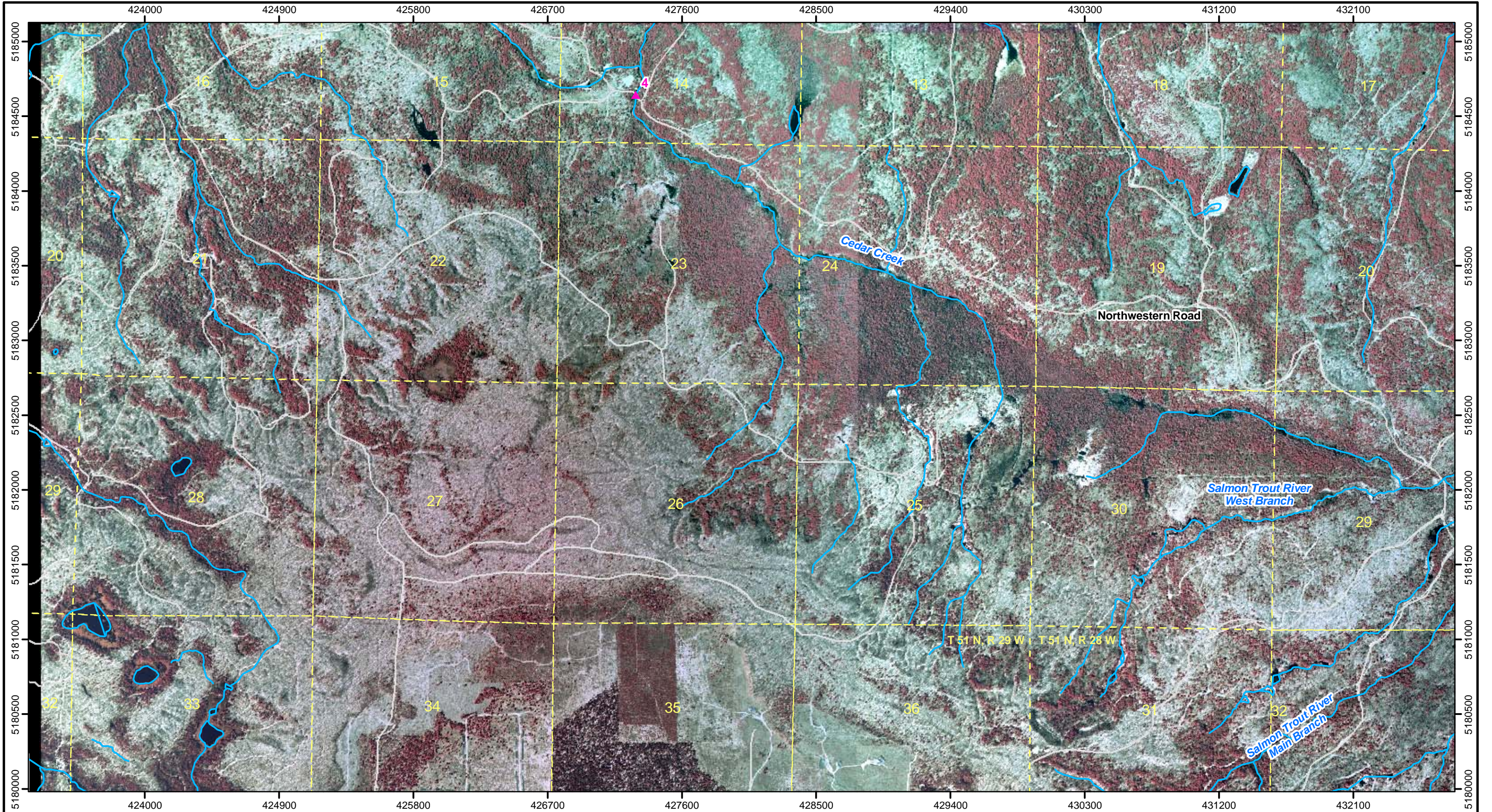


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FIGURE 4-2
SAMPLE STATION LOCATIONS
- EASTERN DETAIL

Scale: 0 300 600 Meters	Date: APRIL, 2007
Prepared by: PEP1	Scope: 04W018



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6 ▲ Aquatic Sampling Location and Number

— River

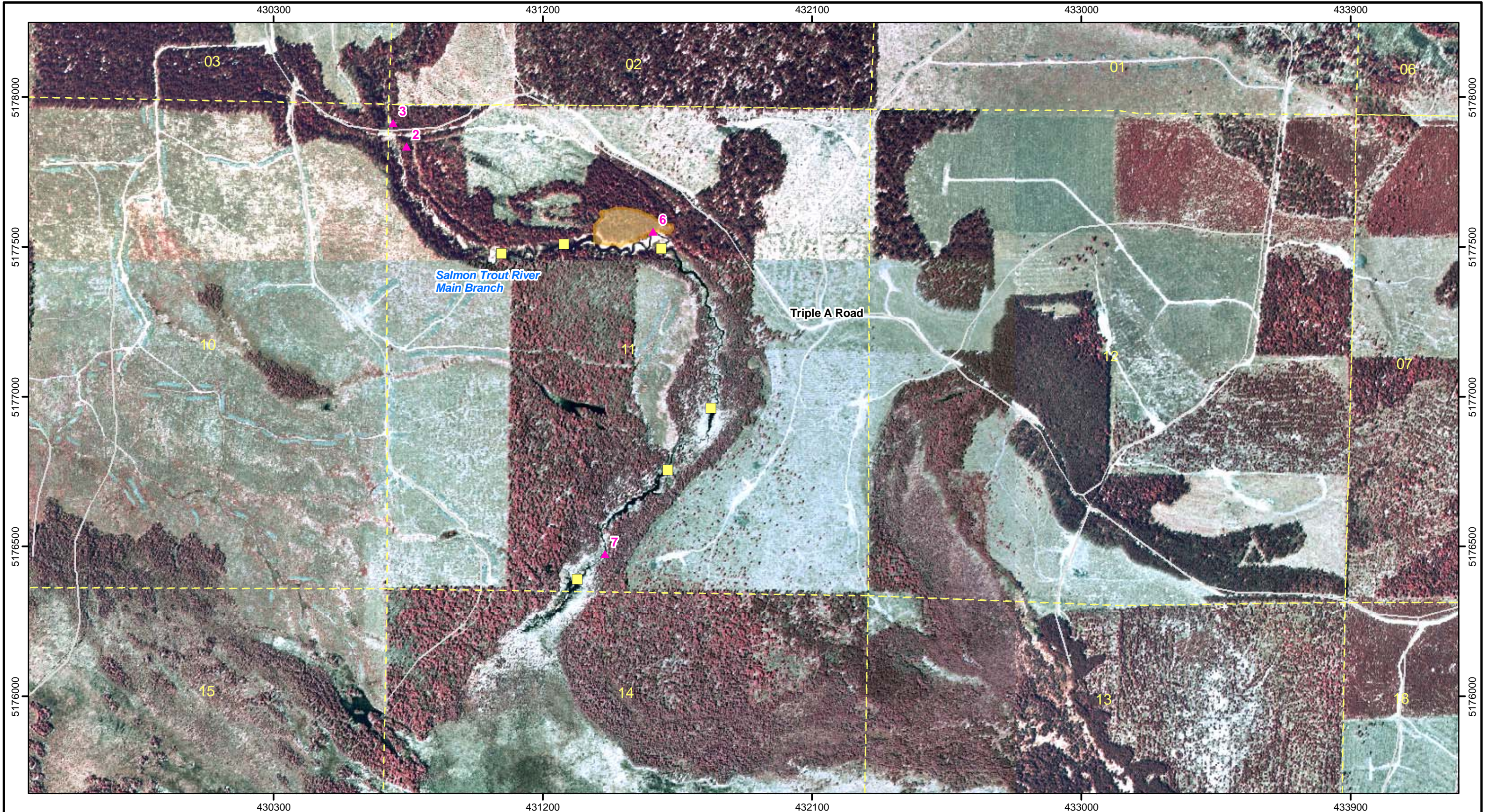


Foth Infrastructure & Environment, LLC			
REVISED	DATE	BY	DESCRIPTION
CHECKED BY:		JOS1	DATE: APR. '07
APPROVED BY:		SVD1	DATE: APR. '07
APPROVED BY:			DATE:



FIGURE 4-3
STATION LOCATIONS - WESTERN DETAIL

Scale:	Date: APRIL, 2007
Prepared by: PEP1	Scope: 04W018



NOTES

1. Surface Property Boundary, Ore Body, and Orthophotography supplied by Kennecott via Golder Associates Inc., August, 2005.
2. Horizontal datum based on NAD 83/94.
Horizontal coordinates based on UTM Zone 16.
3. Site Location - Project Site within Sections 11 & 12, T50N, R29W, Town of Michigamme, Marquette County, Michigan.

LEGEND

- 6 ▲ Aquatic Sampling Location and Number
- River
- Ore Body



Foth Infrastructure & Environment, LLC			
REVISED	DATE	BY	DESCRIPTION
CHECKED BY:		AKM	DATE: APR. '07
APPROVED BY:		SVD1	DATE: APR. '07
APPROVED BY:			DATE:



FIGURE 5-1
BEAVER DAM LOCATIONS
NEAR STATIONS 6 AND 7

Scale: 0 100 200 Meters	Date: APRIL, 2007
Prepared by: PEP1	Scope: 04W018

EXHIBIT C

REPORT PHOTOGRAPHS



Photograph C-1. Station 1 - Downstream Extent View South.



Photograph C-2. Station 1 - Upstream Extent View North.



Photograph C-3. Station 2 – Downstream Extent View South.



Photograph C-5. Station 2 – Upstream Extent View South.



Photograph C-5. Station 3 – Upstream Extent View North.



Photograph C-6. Station 3 – Downstream Extent View South.



Photograph C-7. Station 6 – Upstream Extent View Southwest.



Photograph C-8. Station 7 – Downstream Extent View Southwest.



Photograph C-9. Station 7 – Upstream Extent View North.



Photograph C-10. Station 8 – Downstream Extent View South.



Photograph C-11. Station 8 – Upstream Extent View North.



Photograph C-12. Station 9 – Downstream Extent View Southwest.



Photograph C-13. Station 9 – Upstream Extent View Northeast.



Photograph C-14. Station 5 – Downstream Extent View West.



Photograph C-15. Station 5 – Upstream Extent View South.



Photograph C-16. Station 4 – Downstream Extent View South.



Photograph C-17. Station 4 – Upstream Extent View North.

EXHIBIT B

TABLES

Table 1-1. Summary of the Procedure 51 Macroinvertebrate and Aquatic Habitat Scores for All Stations.

System Station Number	STR 1	STR 2	STR 3	CC 4	YDR 5	STR 6	STR 7	STR 8	STR 9
Fish Score	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Macro. Score	Excellent	Acceptable	Acceptable	Excellent	Acceptable	n/a	n/a	Acceptable	Acceptable
Stream Habitat Score	Excellent	Excellent	Excellent	Excellent	Good	n/a	n/a	Excellent	Good

STR – Salmon Trout River

CC – Cedar Creek

YDR – Yellow Dog River

Table 5-1. Sample Station Location Description.

Station Number	Stream Name		Latitude/Longitude NAD 1983	Township/Range/Section	Location Description
1	Salmon River	Trout	N 46.761302 W 87.90807	Michigamme Twp. T50N, R29W, Sec 3	Approximately 5,220 feet downstream of AAA Road Crossing
2	Salmon River	Trout	N 46.75059 W 87.90720	Michigamme Twp. T50N, R29W, Sec. 11	Immediately upstream of AAA Road Crossing
3	Salmon River	Trout	N 46.75148 W 87.90736	Michigamme Twp. T50N, R29W, Sec. 11	Immediately downstream of AAA Road Crossing
4	Cedar Creek		N 46.81066 W 87.95323	Powell Twp. T51N, R29W, Sec. 14	Approximately 100 feet upstream of Northwestern Road Crossing
5	Yellow Dog River		N 46.72694 W 87.87268	Michigamme Twp. T50N, R29W, Sec. 13	Upstream of road crossing
6	Salmon River	Trout	N 46.74793 W 89.89584	Michigamme Twp. T50N, R29W, Sec. 11	Approximately 4,600 feet upstream of AAA Road Crossing
7	Salmon River	Trout	N 46.73808 W 87.89810	Michigamme Twp. T50N, R29W, Sec. 11	Near headwaters
8	East Salmon River	Branch Trout	N 46.78749 W 87.85124	Powell Twp. T51N, R28W, Sec. 27	Approximately 13,619 feet downstream of Northwestern Road Crossing and immediately upstream of waterfall
9	East Salmon River	Branch Trout	N 46.78367 W 87.85282	Powell Twp. T51N, R28W, Sec. 27	Approximately 12,449 feet downstream of Northwestern Road crossing and upstream of tributary confluence

Table 5-2. Fish Collection Data.

Scientific Name	Common Name	Station Number								
		1	2	3	4	5	6	7	8	9
<i>Cottus cognatus</i>	slimy sculpin					1		1		1
<i>Culaea inconstans</i>	brook stickleback				1		200			
<i>Phoxinus eos</i>	northern redbelly dace						271			
<i>Rhinichthys atratulus</i>	blacknose dace					13				
<i>Salvelinus fontinalis</i>	brook trout	4	4	3	39	1	3			
<i>Semotilus atromaculatus</i>	creek chub					3	1			
Total Number		4	4	3	40	18	475	1	0	1

Salmon Trout River Stations: 1, 2, 3, 6, 7, 8, 9

Cedar Creek Station: 4

Yellow Dog River Station: 5

Table 5-3. Macroinvertebrates Collected by Station.

TAXA	1	2	3	4	5	6	7	8	9
ANNELIDA (segmented worms)									
Hirudinea (leeches)						3			
ARTHROPODA									
Amphipoda (scuds)				9		35	45		
Insecta									
Ephemeroptera (mayflies)									
Baetidae	43	10	5	34	1			66	12
Caenidae					1	4	8		
Ephemerellidae	22		4	13		3		19	10
Ephemeridae	1	2	1	1	8			7	
Heptageniidae	6				5			2	2
Leptophlebiidae	13	3	1	3	1			7	1
Odonata									
Anisoptera (dragonflies)									
Aeshnidae					4	4	3		
Cordulegastridae	1	7	10	5			1		
Corduliidae						14			
Gomphidae					12				
Libellulidae						3	3		
Zygoptera (damselflies)									
Calopterygidae		4	2		6		1		
Coenagrionidae						4	6		
Plecoptera (stoneflies)									
Chloroperlidae	2							1	
Perlodidae				2					
Pteronarcyidae	1			1				2	
Hemiptera (true bugs)									
Corixidae						12			
Gerridae				2	2	3			
Notonectidae						4			
Megaloptera									
Sialidae (alder flies)		2	1	1					
Trichoptera (caddisflies)									
Brachycentridae		5	16	3					2
Glossosomatidae	1								
Hydropsychidae		1	1	3	1			6	5
Lepidostomatidae			3	29				3	
Leptoceridae	14				3				
Limnephilidae		1		5	6			1	
Molannidae	1				1				
Philopotamidae	14		2	2					
Odontoceridae		1						1	

Table 5-3 (Continued).

TAXA	1	2	3	4	5	6	7	8	9
Rhyacophilidae	6								
Uenoidae	3	1							
Coleoptera (beetles)									
Elmidae					1				
Gyrinidae (larvae)						2			
Haliplidae (adults)						5	2		
Noteridae						1			
Diptera (flies)									
Ceratopogonidae	1								
Chironomidae	4	18	2	5	7	8		6	2
Simuliidae			82	2				21	2
Tabanidae				2	1	2		1	
Tipulidae			6	5	1	6		3	9
MOLLUSCA									
Gastropoda (snails)									
Physidae				1	2	2			
Planorbidae						1	2		
Pelecypoda (bivalves)									
Sphaeriidae (clams)				3	3	6	4		
TOTAL INDIVIDUALS	133	55	136	131	66	121	75	146	45

Salmon Trout River Stations: 1, 2, 3, 6, 7, 8, 9

Cedar Creek Station: 4

Yellow Dog River Station: 5

Table 5-4a. Macroinvertebrate Scores and Community Ratings - Salmon Trout River

Station	1		2		3		6		7		8		9	
Metric	Value	Score	Value	Score	Value	Score	Value	Score	Value	Score	Value	Score	Value	Score
Total Number of Taxa	16	0	12	0	14	0	20	0	10	0	15	0	9	-1
Number of Mayfly Taxa	5	1	3	1	4	1	2	-1	1	0	5	1	4	0
Number of Caddisfly Taxa	6	1	5	1	4	0	0	-1	0	-1	4	0	2	-1
Number of Stonefly Taxa	2	1	0	-1	0	-1	0	-1	0	-1	2	1	0	-1
Percent Mayfly Comp.	63.9	1	27.3	1	8.1	0	5.8	0	10.7	0	69.2	1	55.6	1
Percent Caddisfly Comp.	29.3	1	16.4	0	16.2	0	0	-1	0	-1	7.5	0	15.6	0
Percent Dominant Taxon	32.3	-1	32.7	-1	60.3	-1	29.0	-1	60.0	-1	45.2	-1	26.7	0
Dominant Taxon	Ephemeroptera - Baetidae		Diptera - Chironomidae		Diptera - Simuliidae		Amphipoda		Amphipoda		Ephemeroptera - Baetidae		Ephemeroptera - Baetidae	
Percent Isopod, Snail, Leech	0	1	0	1	0	1	5.0	0	2.7	1	0	1	0	1
Percent Surf. Air Breathers	0	1	0	1	0	1	19.0	-1	2.7	1	0	1	0	1
Total Score		6		3		1		-6		-2		4		0
Community Rating	Excellent		Acceptable		Acceptable		n/a		n/a		Acceptable		Acceptable	

Table 5-4b. Macroinvertebrate Scores and Community Ratings for Cedar Creek and Yellow Dog River

Station	4		5	
Metric	Value	Score	Value	Score
Total Number of Taxa	21	0	19	0
Number of Mayfly Taxa	4	0	5	1
Number of Caddisfly Taxa	5	0	4	0
Number of Stonefly Taxa	2	1	0	-1
Percent Mayfly Comp.	38.9	1	24.2	1
Percent Caddisfly Comp.	32.1	1	16.7	0
Percent Dominant Taxon	26.0	0	18.2	0
Dominant Taxon	Ephemeroptera - Baetidae		Anisoptera - Gomphidae	
Percent Isopod, Snail, Leech	0.8	1	3.0	1
Percent Surf. Air Breathers	1.5	1	3.0	1
Total Score		5		3
Community Rating	Excellent		Acceptable	

Cedar Creek Station: 4

Yellow Dog River Station: 5

Table 5-5. Habitat Evaluation by Station.

Habitat Metric	1		2		3		4		5		6		7		8		9	
	rifle/run	glide/pool	rifle/run	glide/pool	rifle/run	glide/pool	rifle/run	glide/pool	rifle/run	glide/pool	rifle/run	glide/pool	rifle/run	glide/pool	rifle/run	glide/pool	rifle/run	glide/pool
Substrate and Instream Cover																		
Epifaunal Sustrate/Avail. Cover	19	16	18	11	10	-	-	17	10									
Embeddedness	19		14			-	-	19										
Pool Substrate Characterization		14		15	10	-	-		12									
Velocity Depth Regime	15		14			-	-	20										
Pool Variability		12		16	14	-	-		12									
Sediment Deposition	15	15	15	13	14	-	-	20	14									
Channel Morphology																		
Maintained Flow Volume	9	9	9	9	9	-	-	9	9									
Flashiness	9	7	10	8	7	-	-	7	7									
Channel Alteration	20	16	18	19	20	-	-	20	19									
Frequency of Riffles/Bends	19		15			-	-	18										
Channel Sinuosity		12		14	14	-	-		18									
Riparian and Bank Structure																		
Bank Stability (L)	9	9	9	8	7	-	-	8	7									
Bank Stability (R)	9	9	9	9	7	-	-	9	7									
Vegetative Protection (L)	10	10	10	10	10	-	-	10	9									
Vegetative Protection (R)	10	10	10	10	10	-	-	10	9									
Riparian Veg. Zone Width (L)	10	10	10	10	10	-	-	10	10									
Riparian Veg. Zone Width (R)	10	10	10	10	10	-	-	10	10									
Total Score	183	159	171	162	152	n/a	n/a	187	153									
Habitat Rating	Excellent	Excellent	Excellent	Excellent	Good	n/a	n/a	Excellent	Good									

Salmon Trout River Stations: 1, 2, 3, 6, 7, 8, 9

Cedar Creek Station: 4

Yellow Dog River Station: 5

Table 5-6. Water Quality Data by Station.

Station Number	Date	Time	Water Temperature (°C)	pH	Conductivity µSiemens/cm	Dissolved Oxygen (mg/l)
1	6/11/2006	19:15	13.48	6.96	58	8.66
2	6/11/2006	16:30	15.68	6.51	51	7.5
3	6/11/2006	17:15	16.37	6.53	51	7.57
4	6/10/2006	19:30	12.95	7.65	114	7.91
5	6/12/2003	19:43	15.6	6.62	56	7.78
6	6/12/2006	17:25	18.54	6.43	54	7.05
7	6/13/2006	10:05	14.01	6.18	44	2.52
8	6/13/2006	12:42	10.25	7.53	111	9.04
9	6/13/2006	13:34	10.17	7.51	111	9.54

Salmon Trout River Stations: 1, 2, 3, 6, 7, 8, 9

Cedar Creek Station: 4

Yellow Dog River Station: 5