SNC·LAVALIN

FINAL REPORT

Government of Newfoundland and Labrador

Human Health and Ecological Risk Assessment Problem Formulation and Sampling Analysis Plan

Former Salmonier Correctional Facility, Salmonier, NL

Project No.: 723111

January 2010

Certified ISO 9001

SNC·LAVALIN Environment

HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENT PROBLEM FORMULATION AND SAMPLING ANALYSIS PLAN
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Former Salmonier Correctional Facility – Salmonier, NL

Prepared for:
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EXECUTIVE SUMMARY

SNC-Lavalin Environment Inc. (SLEI) was retained by the Newfoundland and Labrador Department of Environment and Conservation (DOEC) to conduct a human health and ecological risk assessment Problem Formulation and Sampling Analysis Plan (PSAP) for the former agricultural fields located at the Salmonier Correctional Facility (the site), at Salmonier, NL. A cottage redevelopment plan has been proposed as the future land use of the site.

The PSAP addresses pesticides from agricultural operations at the former correctional facility and uses information collected during previous site investigations. These site investigations reported that pesticides were not detected in groundwater or surface water at the site. Dieldrin was the only pesticide detected in soil at the site. Eleven pesticide compounds were detected in sediment collected from ponds near the agricultural fields at the site (i.e., aldrin, a-chlordane, g-chlordane, 4,4-DDE, dichlofluanid, heptachlor, heptachlor epoxide, hexachlorobenzene, pentachloronitrobenzene, profenophos, and propazine).

The purpose of the problem formulation was to identify chemicals of potential concern (COPC), receptors of concern, and exposure pathways at the site for ecological and human receptors. The problem formulation was conducted according to guidance provided by Canadian federal and provincial regulatory agencies, as well as international agencies and resources. The problem formulation is used by site managers to identify potential concerns, determine if a risk assessment is required, and identify additional data requirements.

COPC for ecological receptors at the site include dieldrin in soil and chlordane, DDE, dichlofluanid, heptachlor epoxide, pentachloronitrobenzene, profenophos, and propazine in sediment. Ecological receptors of concern include all plant, invertebrate, bird, mammal and amphibian species that have the potential to spend significant amounts of time feeding or breeding on the site. Several species were selected to represent critical components of the ecosystem (i.e., valued ecosystem components [VECs]) on which a quantitative risk assessment could be conducted. The selected VEC species may be revised as the ecological risk assessment progresses. Ecological receptors may be exposed to COPC through direct contact with soil or sediment or indirect exposure through the food chain (i.e., through ingestion of vegetation or prey which has taken up contaminants).

The human health problem formulation identified dieldrin in soil and chlordane, DDE, dichlofluanid, heptachlor, heptachor epoxide, hexachlorobenzene, pentachloronitrobenzene, profenophos, and propazine in sediment as COPCs. People likely to be present at the site under a future cottage land use include cottage residents of all ages and people using the site for recreation. Direct contact with pesticide in soil and sediment could occur for people who spend time at the site. The inhalation of pesticides in outdoor air could also occur at the site. People could also catch and eat fish living in ponds with pesticides in sediment at the site.

Based on the ecological and human health problem formulations, a quantitative human health and ecological risk assessment (HHERA) is recommended at the site. The quantitative human health and ecological risk assessment would evaluate the potential risks from pesticides in soil and sediment at the site to residents and recreational visitors, and aquatic and terrestrial ecological receptors. Additional information required to conduct the risk assessment includes fish tissue analyses, sediment analyses, sediment toxicity testing and a habitat assessment.

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ACRONYMS

CCME	Canadian Council for Ministers of the Environment
COPC	Chemicals of Potential Concern
DOEC	Newfoundland and Labrador Department of Environment and Conservation
EC	Environment Canada
ERA	Ecological Risk Assessment
HQ	Hazard Quotient
HHERA	Human Health and Ecological Risk Assessment
HHRA	Human Health Risk Assessment
ILCR	Incremental Lifetime Cancer Risk
ISQG	Interim Sediment Quality Guidelines
MDEPC	Ministère du Développement durable, de l'Environnement et des Parcs du Québec
MGI	MGI Limited
NJ DEP	New Jersey Department of Environmental Protection
NYSDEC	New York State Department of Environmental Conservation
OC	Organic carbon
PEL	Probable effects level
PSAP	Problem Formulation and Sampling Analysis Plan
QA/QC	Quality Assurance/Quality Control
SLEI	SNC-Lavalin Environment Inc.
SLI	SNC-Lavalin Inc.
TEL	Threshold effects level
US EPA	United States Environmental Protection Agency
VEC	Valued Ecosystem Components

1. INTRODUCTION

SNC-Lavalin Environment Inc. (SLEI) was retained by the Newfoundland and Labrador Department of Environment and Conservation (DOEC) to conduct a Problem Formulation and Sampling Analysis Plan (PSAP) for the agricultural fields at the former Salmonier Correctional Facility (the site), at Salmonier, NL. The PSAP addresses pesticides from agricultural operations at the former correctional facility and uses information collected during previous site investigations. The site was a correctional facility from the mid-1930s to 2004 and included dormitories, a warden's residence, a chapel, garages, barns, three landfill sites, and 45 hectares of farmland. All infrastructure was removed and the landfills were decommissioned at the site in 2007. The proposed future land use for the site is recreational and residential as part of the Salmonier Cottage Initiative. The PSAP evaluates data collected at the site up to August, 2009 and the proposed future recreational/residential land use.

1.1. Objectives

Problem formulation is the first step of both human health and ecological risk assessments. The purpose of the problem formulation is to identify chemicals of potential concern, receptors of concern, and exposure pathways at a site. The problem formulation is used by site managers to identify potential concerns at a site, determine if a risk assessment is required, and identify additional data requirements.

The objectives of the PSAP at the site are as follows:

- Identify chemicals of potential concern (COPC). COPC are chemicals in site media (soil, groundwater, surface water or sediment) that are site-related, are above applicable regulatory guidelines or have the potential to cause risk;
- Identify human and ecological receptors that could be exposed to COPC at the site. Receptors are humans, plants, invertebrates, amphibians, birds and mammals that have the potential to use the site;
- Identify exposure pathways from the COPC in site media to human and ecological receptors;
- Develop a conceptual model for the site identifying contaminated media, contaminant transport pathways, receptors of concern and exposure pathways;

- Identify additional data requirements to either conduct a risk assessment or develop a remediation plan;
- Develop a sampling plan to address data requirements identified in the problem formulation; and
- Prepare a report presenting the results of the PSAP.

1.2. Site Description

The site is located approximately 50 km west of St. John's, NL on the Salmonier Line (Route 90), approximately 10 km from the intersection of the Salmonier Line and the Trans Canada Highway (Figures 1 & 2). The site is surrounded by a cottage area (commonly referred to as Deer Park) and by undeveloped vegetated land. The Salmonier Nature Park is located to the east of the site, off the Salmonier Line (Route 90).

The site area encompasses approximately 902 hectares, with 8 hectares formerly used for infrastructure and 45 hectares formerly used for farmland and agriculture. The site is moderately sloped and contains several water bodies, including Oxley's Pond and Little Gull Pond. All buildings and infrastructure were removed from the site in 2007 and the three landfills were decommissioned in 2007. There is an existing road network within the site that had been used for access to the Salmonier Correctional Facility and agricultural fields.

The undeveloped portion of the site (approximately 849 hectares) consists of a mixture of mature boreal forest, water bodies and bogs. Water bodies comprise approximately 30% of the total undeveloped portion of the site resulting in extensive shorelines. The remainder consists of hilly terrain mixing with bogs in the low-lying areas. Surface drainage is anticipated to be varied throughout the site and follow local topographic conditions.

1.3. Regulatory Framework

Currently, the province of Newfoundland and Labrador does not have guidelines for pesticides. Analytical results were screened against Canadian Council of Ministers of the Environment (CCME) guidelines, provincial guidelines (Ontario and BC) and United States Environmental Protection Agency (US EPA) guidelines.

The PSAP was developed using guidance from CCME and Health Canada for conducting risk assessments in Canada. Additional guidance from international regulatory agencies (i.e., US EPA) was also consulted as needed.

2. PREVIOUS ENVIRONMENTAL SITE ASSESSMENT

Soil, groundwater, surface water and sediment have been assessed at the site and results have been presented in the following reports:

- Phase I/II ESA, Developed Portion Of Site, Salmonier Correctional Facility, Salmonier, NL. Prepared by MGI Limited (MGI) in 2004; and
- Supplemental Phase II Environmental Site Assessment, Former Salmonier Correctional Facility, Salmonier, Newfoundland and Labrador. Prepared by SNC-Lavalin Inc (SLI) in 2009.

Additional sediment samples were collected on August 27, 2009 from Pond I, Pond J and Pond K by SLI in support of the PSAP (see Figure 3 for labelling). The additional samples were collected from the centre of the ponds using an Eckman dredge sampler. Supplemental sediment analyses are presented in Table 2-1.

Concentrations of chemicals analyzed in surface water, soil, and groundwater are available in the SLI (2009) report. Sampling locations are presented in Figures 3 (sediment/surface water), 4 (soil), and 5 (groundwater).

Maximum detectable concentrations of pesticides in site media are presented in Table A below. Several pesticides are assessed as a group and their concentrations are summed before comparing to regulatory guidelines (e.g., DDD/DDE/DDT). If a chemical that requires a summed value was below the detection limit, half the detection limit was used to estimate the concentration in the chemical group.

Table A: A Maximum Detectable Concentrations of Pesticides in Site Media

Chemical	Soil (mg/kg)	Groundwater (mg/L)	Surface Water (mg/L)	Sediment (mg/kg)
Aldrin	<0.05	<0.02	<0.02	**0.00111**
Dieldrin	**4.5**	<0.03	<0.03	<0.0020
Aldrin+Dieldrin	**4.5**	<0.03	<0.03	**0.00136**
a-Chlordane	<0.01	<0.06	<0.06	**0.0027**
g-Chlordane	<0.01	<0.06	<0.06	**0.0023**
Chlordane	<0.01	<0.06	<0.06	**0.005**
2,4'-DDD	<0.01	<0.01	<0.01	<0.0010
4,4'-DDD	-	-	-	<0.0010
2,4'-DDE	<0.01	<0.01	<0.01	<0.0010
4,4'-DDE	<0.05	<0.01	<0.01	**0.0016**
2,4'-DDT	-	-	-	<0.0010
4,4'-DDT	<0.02	<0.01	<0.6	<0.0010
2,4'-DDT + 4,4'-DDD	<0.01	<0.01	<0.01	-
DDD	<0.01	<0.01	<0.01	<0.001
DDE	<0.03	<0.01	<0.01	**0.0021**
DDT	<0.02	<0.01	<0.3	<0.001
DDD/DDE/DDT	<0.05	<0.03	<0.3	**0.0041**
Dichlofluanid	<0.02	<0.5	<0.5	**0.0078**
Heptachlor	<0.02	<0.1	<0.1	**0.0067**
Heptachlor epoxide	<0.01	<0.1	<0.1	**0.0036**
Heptachlor + Heptachlor epoxide	<0.02	<0.1	<0.1	**0.0103**
Hexachlorobenzene	<0.03	<0.2	<0.2	**0.0012**
Pentachloronitrobenzene	<0.05	<0.5	<0.5	**0.0014**
Profenophos	<0.05	<0.5	<0.5	**0.0018**
Propazine	<0.02	<0.1	<0.1	**0.0034**

Note: detected concentrations are bolded.

Pesticides were not detected in groundwater or surface water at the site.

Dieldrin was detected in 16 soil samples located in the north eastern portion of the site.

Aldrin was detected in sediment in Oxley's Pond and Pond K. Dichlofluanid was detected in Oxley's Pond, Pond J and Pond K sediments. Profenophos was detected in Pond J sediments and propazine was detected in sediments from Pond J and Pond K. Sediment samples from Pond K also had detectable concentrations of a-chlordane, g-chlordane, 4,4-DDE, heptachlor, heptachlor epoxide, hexachlorobenzene, and pentachloronitrobenzene, All other ponds sampled at the site (Little Gull Pond, Oxley's Second Pond, Ponds A through Pond I, and Pond L) had non-detectable concentrations of all pesticides analyzed in sediment.

3. ECOLOGICAL PROBLEM FORMULATION

Ecological risk assessment is an evaluation technique designed to help answer questions about the likelihood of adverse effects to populations of ecological receptors from exposure to chemicals in the environment. Risk assessment is not an exact science and is generally based on conservative methods and assumptions that ensure exposures and risks are not underestimated. If negligible or acceptable risks are predicted in a risk assessment using a conservative approach, actual risks at a site are almost certainly negligible or acceptable. If a risk assessment predicts the potential for unacceptable risks, actual site conditions are not necessarily unacceptable, but further assessment, review and validation of conservative assumptions and uncertainty are necessary to define the extent of potential ecological risks.

Problem formulation is the first step in an ecological risk assessment and includes the selection of COPC, receptors of concern, and exposure pathways. Regulatory guidance documents consulted in the development of the ecological problem formulation for the site include:

- A Framework for Ecological Risk Assessment: General Guidance (CCME, 1996); and
- A Framework for Ecological Risk Assessment: Technical Appendices (CCME, 1997).

Other sources of information may include (but are not limited to):

- A Protocol for the Derivation of Environmental and Human Health Soil Quality Guidelines (CCME, 2006 and updates);
- Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments – Interim Final (US EPA, 1997);
- A Framework for Ecological Risk Assessment at Contaminated Sites in Canada: Review and Recommendations (EC, 1994);
- Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments – Interim Final (US EPA, 1997); and
- Guidelines for Ecological Risk Assessment. EPA/630/R-95/002F (US EPA, 1998).

The ecological problem formulation includes the following components:

- Identification of COPCs;
- Identification of receptors of concern;
- Identification and selection of Valued Ecosystem Components (VEC);
- Evaluation of exposure pathways;
- Identification of assessment and measurement endpoints; and
- Development of a conceptual site model.

3.1. Chemicals of Potential Concern (COPCs)

Chemicals of potential concern (COPCs) are chemicals which are related to site activities and measured at concentrations exceeding applicable regulatory guidelines or measured background concentrations. Since pesticides are not naturally-occurring substances, background concentrations were assumed to be negligible for the COPC screening process. Pesticides which were detected, but had no federal, provincial or international guidelines were included as COPCs.

3.1.1. Soils

Dieldrin was the only pesticide detected in soil at the site. Currently, there is no CCME guideline for dieldrin. US EPA Regions 3/6/9 have a human health guideline of 0.03 mg/kg in residential soil. In lieu of an appropriate ecological soil guideline, dieldrin was included as a COPC in soil.

A risk assessment of the potential effects of dieldrin on the ecological community at the site would require the development of toxicological reference values for terrestrial plants, terrestrial invertebrates and wildlife from available scientific literature. Tissue concentrations resulting from exposure to dieldrin in soil are recommended to be estimated from bioconcentration and bioaccumulation factors available in the literature. It is not recommended at this time to sample plant, terrestrial invertebrate or wildlife (game) at the site. If the estimated tissue concentrations are not scientifically defensible, then terrestrial tissue collection and analysis may be recommended at a later date.

3.1.2. Sediment

Maximum concentrations of pesticides in sediment were compared to relevant regulatory guidelines and are presented in Tables B and C. Sediment guidelines were available for the protection of benthic invertebrates (Table B) and for the protection of wildlife through the bioaccumulation of pesticides into fish tissues (Table C).

Sediment guidelines for the protection of benthic invertebrates are presented as Interim Sediment Quality Guidelines (ISQG), Threshold Effect Levels (TEL) or Probable Effects Levels (PEL). ISQGs and TELs represent sediment guidelines below which adverse effects on benthic organisms are not expected. PELs are sediment guidelines above which adverse effects are likely to occur. Concentrations of chemicals between the ISQG/TEL and the PEL have the potential to cause adverse effects.

Potential risks from chemicals of concern in sediments are assessed by a weight of evidence approach in several jurisdictions in Canada and United States (OMOE, 2008; EC and MDEPC, 2007; NJ DEP, 1998; MacDonald and Ingersol, 2002a, 2002b, 2002c). Remediation of sediments typically includes dredging or deposition of uncontaminated material over the contaminated sediments. Sediment remediation needs to be carefully examined as it can cause a major disruption of the ecological community in the waterbody or cause the mobilization of chemicals in consolidated sediments. Thus, multiple lines of evidence are collected and examined to determine the true extent of impacts contaminated sediments are having on an aquatic community.

Table B: COPC in Sediment for Benthic Invertebrates

Chemical	Sediment (mg/kg dw)	Protection of Benthic Invertebrates Guideline (mg/kg dw)		Potential Adverse Effect Level	Source
		ISQG/TEL	PEL		
Aldrin	0.00111	0.002	8 mg/kg OC	Low	OMOE (2008)
Dieldrin	<0.0020	0.00285	0.00667	Low	CCME (1999)
a-Chlordane	**0.0027**	-	-	Unknown	-
g-Chlordane	**0.0023**	-	-	Unknown	-
Chlordane	**0.005**	0.0045	0.00887	Mid	CCME (1999)
2,4'-DDD	<0.0010	-	-	Unknown	-
4,4'-DDD	<0.0010	0.008	6 mg/kg OC	Low	OMOE (2008)
2,4'-DDE	<0.0010	-	-	Unknown	-
4,4'-DDE	0.0016	0.005	19 mg/kg OC	Low	OMOE (2008)
2,4'-DDT	<0.0010	-	-	Unknown	-
4,4'-DDT	<0.0010	-	-	Unknown	-
DDD	<0.001	0.00354	0.00851	Low	CCME (1999)
DDE	**0.0021**	0.00142	0.00675	Mid	CCME (1999)
DDT	<0.001	0.00119	0.00477	Low	CCME (1999)
DDD/DDE/DDT	0.0041	0.00528	0.572	Low	US EPA (2009)
Dichlofluanid	**0.0078**	-	-	Unknown	-
Heptachlor	0.0067	0.068	-	Low	US EPA (2009)
Heptachlor epoxide	**0.0036**	0.0006	0.00274	High	CCME (1999)
Hexachlorobenzene	0.0012	0.02	-	Low	US EPA (2009)
Pentachloronitrobenzene	**0.0014**	-	-	Unknown	-
Profenophos	**0.0018**	-	-	Unknown	-
Propazine	**0.0034**	-	-	Unknown	-

Note: Bold values indicate COPC. dw- dry weight, Potential Adverse Effect Level: Low – Maximum site concentration is lower than the ISQG/TEL, Mid - Maximum site concentration is higher than the ISQG/TEL, but lower than the PEL, High - Maximum site concentration is higher than the PEL.

Sediment quality guidelines for the protection of wildlife from the ingestion of fish that may bioaccumulate pesticides into their tissues were available from New York State Department of Environmental Conservation (NYSDEC, 1999). The wildlife sediment guideline is presented in units of milligram per kilogram of organic carbon (mg/kg OC). The sediment data collected for the site is presented as milligram per kilogram of dry weight sediment (mg/kg dw). In lieu of organic carbon data at the site, the wildlife sediment guideline was conservatively compared to site data assuming sediments are 100% organic carbon.

Table C: COPC in Sediment for Wildlife Ingestion of Fish

Chemical	Sediment (mg/kg dw)	Protection of Wildlife Ingestion of Fish Guideline (mg/kg OC)	Source
Aldrin	0.00111	-	-
Dieldrin	<0.0020	-	-
Aldrin+Dieldrin	0.00136	0.77	NYSDEC (1999)
a-Chlordane	0.0027	-	-
g-Chlordane	0.0023	-	-
Chlordane	0.005	0.006	NYSDEC (1999)
2,4'-DDD	<0.0010	-	-
4,4'-DDD	<0.0010	-	-
2,4'-DDE	<0.0010	-	-
4,4'-DDE	**0.0016**	-	-
2,4'-DDT	<0.0010	-	-
4,4'-DDT	<0.0010	-	-
Dichlofluanid	**0.0078**	-	-
Heptachlor	**0.0067**	-	-
Heptachlor epoxide	0.0036	0.03	NYSDEC (1999)
Hexachlorobenzene	0.0012	12	NYSDEC (1999)
Pentachloronitrobenzene	**0.0014**	-	-
Profenophos	**0.0018**	-	-
Propazine	**0.0034**	-	-

Note: Bold values indicate COPC. dw- dry weight, OC- organic carbon.

COPC in sediment for benthic invertebrates are chlordane, DDE, dichlofluanid, heptachlor epoxide, pentachloronitrobenzene, profenophos, and propazine. The following recommendations are made with regard to benthic invertebrates:

- Since benthic invertebrates are the primary food source for most fish species, include benthic invertebrates in an ecological risk assessment;
- Develop toxicity reference values for COPC which do not have available guidelines, if sufficient data exists in the literature; and
- Further evaluate the potential risk to the benthic invertebrate communities in Oxley's Pond, Pond K and Pond J (as presented in Section 5).

COPC in sediment for wildlife are 4,4'-DDE, dichlofluanid, heptachlor, pentachloronitrobenzene, profenophos, and propazine. Since all of the COPCs in sediment are bioaccumulative, a risk assessment of the potential risks to wildlife consuming fish at the site is recommended. The

recommended sampling and analysis plan for the assessment of risk to the aquatic community is presented in Section 5.

3.2. Receptors of Concern

The receptors of concern for the site are plant, invertebrate and wildlife species that may potentially be exposed to contaminants in site soil or sediments. As it is not feasible to consider all of the plant and wildlife species that may be potentially present at the site, several species are selected to represent critical components of the ecosystem (i.e., valued ecosystem components [VECs]). VECs are identified as species or attributes of the ecosystem that are critical to the functioning of the ecosystem. Protection of the VECs would then protect the ecosystem at a site.

The selection process for VECs at the site entails compiling and reviewing species lists for mammals, birds and amphibians. Habitat at the site is compared to the known habitat requirements for each species. Species likely to be present on the site are grouped into trophic guilds or feeding groups and a representative from each feeding group is selected as a VEC. The species selected are expected to be exposed to contaminants on the site and are potentially sensitive to this exposure. VECs may also be ecologically significant, have economic or social value, or be endangered/at risk. Protection of the most sensitive member of a feeding group would be protective of the rest of the species within the group.

Species lists for the site have been constructed (Table 3-1) and include birds, amphibians and mammals that potentially use the site as feeding or breeding habitat, during part or all of the year. Table D, below, shows the feeding groups from which VECs will be selected for the ecological risk assessment and potential VEC species. The selected VEC species may be revised as the ecological risk assessment progresses.

3.2.1. Listed Species Considerations

Species that are listed by either provincial or federal agencies as vulnerable, special concern, threatened, or endangered were considered for inclusion as VECs. Listed species that are potentially present on or near the Site would be included as VEC. Listed species that are not present or those that do not have suitable habitat on the Site are excluded as potential VEC species. Listed species that may be present on the Site are potentially included as VEC.

Detailed risk assessment of listed species is protective of the health of individuals since the loss of one individual could have a large effect on the species population. Additional Site information, including a habitat assessment, may cause a revision of the potential VECs which are assessed in the risk assessment.

The Newfoundland martin (*Martes americana atrata*) is listed as threatened by DOEC (2009) and by the Species at Risk Public Registry (2009) and was evaluated for inclusion as a VEC for the Site. There is currently no population of Newfoundland martin on the Avalon Peninsula and the nearest population is more than 100 km from the Site (Species at Risk Public Registry, 2009). Since the Newfoundland martin is not present on or near the Site, they are not included as a VEC. The ermine was selected as the VEC for the small predatory mammal feeding group. Protection of the ermine at the Site would also protect all small predatory mammals including Newfoundland martin, should their range increase in the future.

In addition to the Newfoundland martin, the following listed species are further than 100 km from the Site and were not considered as VEC: banded killifish (*Fundulus diaphanus*), ivory gull (*Pagophila eburnea*), piping plover (*Charadrius melodius melodius*), peregrine falcon (*Falco peregrinus anatum* and *Falco perengrinus tundrius*), woodland caribou (*Rangifer tarandus caribou*), wolverine (*Gulo gulo*), polar bear (*Ursus maritimus*), mountain holly fern (*Polystichum scopulinum*), low northern rockcress (*Neotorulia humilis*), Fernald's braya (*Braya fernaldii*), Long's braya (*Braya longii*), Fernald's milk-vetch (*Astragalus robbinsii* var. *fernaldii*), Porsid's bryum (*Mielichhoferia macrocarpa*), and barrens willow (*Salix jejuna*).

Based on the general habitat of the Site, the red knot (*Calidris canutus rufa*) and the harlequin duck (*Histrionicus histrionicus*) are unlikely to be present on the Site and were therefore not included as VEC.

Boreal felt lichen (*Erioderma pedicellatum*) could potentially be present on the Site if suitable habitat is available. Boreal felt lichen is listed as a species of special concern by the Species at Risk Public Registry (2009) and as vulnerable by DOEC (2009) and has been recorded in the vicinity of the Site. Based on this preliminary assessment, boreal felt lichen is tentatively included as a potential VEC at the Site.

Red crossbill (*Loxia curvirostra percna*) is listed as endangered by both DOEC (2009) and the Species at Risk Public Registry (2009). Red crossbill has been identified in the vicinity of the Site. The available habitat on the Site could potentially be suitable for the habitat requirements for the red crossbill. The red crossbill is tentatively included as a potential VEC at the Site.

The olive-sided flycatcher (*Contopus cooperi*) is listed as threatened by the Species at Risk Public Registry (2009). The olive-sided flycatcher is not currently assessed by DOEC (2009). The Site has habitat that could potentially be suitable for olive-sided flycatchers. Thus, the olive-sided flycatcher is tentatively included as a potential VEC.

The short-eared owl (*Asio flammeus*) is listed by DOEC (2009) as vulnerable and as of special concern by the Species at Risk Public Registry (2009). Suitable habitat for the short-eared owl is potentially present on the Site. Thus, the short-eared owl was tentatively selected as a potential VEC.

Rusty blackbird (*Euphagus carolinus*) is listed as of special concern by the Species at Risk Public Registry (2009). The rusty blackbird is not currently assessed by DOEC (2009). Habitat present on the Site is potentially suitable for rusty blackbird; thus, the rusty blackbird was tentatively included as a potential VEC.

Barrow's goldeneye (*Bucephala islandica*) is listed as vulnerable by DOEC (2009) and special concern by Species at Risk Public Registry (2009). There may be suitable habitat for Barrow's goldeneye on parts of the Site. Barrow's goldeneye has been recorded approximately 50 km away from the Site which is within the distance a goldeneye could travel. A habitat assessment and review of local bird sighting reports would be helpful in identifying whether Barrow's goldeneye could be present on the Site in the future. Based on this preliminary assessment, Barrow's goldeneye are provisionally included as VEC.

The American eel (*Anguila rostrata*) is listed as of special concern by Species at Risk Public Registry (2009). The American eel is not currently assessed by DOEC (2009). American eel inhabits both freshwater and marine habitat and requires a connection to marine environments to maintain a viable population. Based on a review of topographic maps of the water bodies in the vicinity of the Site, Pond K, Pond J and Oxley's Pond appear to be hydraulically connected to Little Gull Pond which is ultimately connected to the Back River which is a tributary of the

Salmonier River. The Salmonier River drains into the Salmonier Arm of St. Mary's Bay which is part of the Atlantic Ocean where American eel are reported to spawn. A habitat assessment and review of local fisheries reports would be helpful in identifying whether American eel could be present on the Site. Based on this preliminary assessment, American eel are provisionally included as VEC.

Table D: Ecological Receptors of Concern – Potential Valued Ecosystem Component Species

Potential Representative Species	Feeding Group
Terrestrial Community	
Generic terrestrial plant species	Terrestrial plants
Generic soil invertebrate species	Soil Invertebrates
Boreal felt lichen	Lichen Listed Species – Vulnerable
Meadow vole	Small herbivorous mammals
Masked shrew	Small insectivorous mammals
Ermine	Small predatory mammals
Moose	Larger herbivorous mammals
Red fox	Larger predatory mammals
Pine grosbeak	Herbivorous birds
Red crossbill	Herbivorous bird Listed Species – Endangered
American robin	Insectivorous birds
Olive-sided flycatcher	Insectivorous bird Listed Species – Threatened
Rough-legged hawk	Predatory birds
Short-eared owl	Predatory bird Listed Species - Vulnerable
Aquatic Community	
General aquatic plant species	Aquatic plants/Algae
General aquatic invertebrate species	Aquatic invertebrates
Mallard	Aquatic herbivorous birds
Common snipe	Aquatic insectivorous birds
Rusty blackbird	Aquatic insectivorous bird Listed Species – Special Concern
Barrow's goldeneye	Aquatic insectivorous bird Listed Species – Special Concern
Leopard frog	Amphibians
Three-spine stickleback	Forage fish
Brook trout	Piscivorous fish
American eel	Piscivorous fish Listed Species – Special Concern
Mink	Piscivorous mammals
Belted kingfisher	Piscivorous birds
Osprey	Predatory birds

3.3. Exposure Pathways

Exposure pathways are how the receptors of concern may be exposed to COPC in soil or sediment at the site. Exposure pathways of concern are illustrated in the conceptual site model drawing (Drawing 723111-001).

COPC are present in surface soil and sediment; thus, ecological receptors may be exposed to COPC in through direct contact with soil or sediment (yellow arrows on Drawing 723111-001). Food chain exposure (i.e., through ingestion of vegetation or prey which has taken up contaminants) is the other complete exposure pathway at the site (red arrows on Drawing 723111-001).

3.4. Assessment Endpoints

Assessment endpoints are the environmental values to be protected and are consistent with guidance provided by CCME (1996, 1997).

Assessment endpoints at the site are as follows:

- For plants and invertebrates, assessment endpoints are to maintain viable populations that can support consumption by birds and mammals; and
- For birds and mammals, assessment endpoints include maintenance of viable populations that can support predation and body burdens of bioaccumulative contaminants which do not cause risk to upper trophic levels.

3.5. Preliminary Measurement Endpoints

Measurement endpoints are the measurable ecological characteristics that are related to the assessment endpoints chosen and are measures of biological effects.

Measurement endpoints at the site include mortality, reproduction and growth of VECs. Risk to VEC populations will be estimated using modelled Hazard Quotients. Hazard Quotients are calculated by comparing estimated exposure (from contaminated soil, groundwater and prey items) for a VEC to the toxicological reference value (obtained from the literature). In addition to Hazard Quotients, laboratory bioassays of the toxicity of site sediments to invertebrates and juvenile fish are also recommended to assess potential toxicity of the sediments.

3.6. Conceptual Model

A drawing of the conceptual site model for the site is presented in Drawing 723111-001. The conceptual site model drawing illustrates contaminant transport pathways and exposure pathways for ecological receptors.

4. HUMAN HEALTH PROBLEM FORMULATION

As discussed in previous sections, site investigations have indicated the presence of certain pesticides in soil and sediment. As a result, a HHRA is being considered to evaluate whether or not the sites pose unacceptable risk if left in the current condition and under future residential (cottage) land use.

4.1. Components of a Typical HHRA

A HHRA typically consists of the following four phases of analyses:

1) Problem Formulation: identification of the chemicals, exposure pathways and persons to be evaluated in the risk assessment;

2) Exposure Assessment: estimation of the rate of exposures that people may receive from chemicals at the sites;

3) Toxicity Assessment: determination of the acceptable rates of exposure from various health agencies; and

4) Risk Characterization: comparison of the estimated exposures to dose levels considered to be acceptable.

The methods used to estimate human health risks will be based on risk assessment procedures recommended by Health Canada but also commonly used by regulatory agencies across Canada and the United States. In particular, guidance provided by Health Canada will also be given consideration in the HHRA. Guidance for completion of a HHRA is available from Health Canada in the following documents (note that some are draft but still recommended for use by Health Canada):

- Health Canada. 2004. Federal Contaminated Site Risk Assessment in Canada, Part I: Guidance on Human Health Preliminary Quantitative Risk Assessment (PQRA) and Part II: Toxicological Reference Values. Contaminated Sites Division, Safe Environments Programme, Health Canada, Ottawa, ON.

- Health Canada. 2007a (draft). Federal Contaminated Site Risk Assessment in Canada, Part I: Guidance on Human Health Preliminary Quantitative Risk Assessment (PQRA). Contaminated Sites Division, Safe Environments Programme, Health Canada, Ottawa, ON.
- Health Canada. 2007b (draft). Federal Contaminated Site Risk Assessment in Canada, Part V: Guidance on Complex Site Specific Human Health Risk Assessment of Chemicals (SSRACHEM). Contaminated Sites Division, Safe Environments Programme, Health Canada, Ottawa, ON.
- Health Canada. 2008 (draft). Federal Contaminated Site Risk Assessment in Canada, Part IV: Spreadsheet Tool for Human Health Preliminary Quantitative Risk Assessment (PQRA). Contaminated Sites Division, Safe Environments Programme, Health Canada, Ottawa, ON.

The HHRA will involve evaluation of chemicals found to exceed applicable standards/guidelines and will be completed as a comparison of the estimated exposure to dose levels considered to be acceptable or "safe". For assessment of risks to persons spending time at the various sites, potential exposures will be primarily based on environmental concentrations measured at the sites. The toxicological literature will be then reviewed to identify rates of exposures to chemicals that have been determined to be "safe" (or more specifically, rates of exposure without appreciable risk to human health). The final step in the risk assessment will be the comparison of the estimated rate of exposure to dose rates considered to be "safe" for humans. Health Canada provides acceptable levels of risks as follows:

- Hazard Quotient values of 0.2; and
- Incremental Lifetime Cancer Risk [ILCR] estimates of 1×10^{-5}.

At the current time, the HHRA has progressed to the completion of a preliminary problem formulation. This section of the report presents the results of the preliminary problem formulation exercise for the HHRA. The specific chemicals, exposure pathways and persons to be evaluated in the HHRA are described in greater detail in the sections below.

4.2. Chemicals of Potential Concern

4.2.1. Soils

As discussed in earlier sections, dieldrin is the only chemical that was detectable in soil. All other pesticides were found at concentrations less than detection limits. In the case of dieldrin, no Canadian soil quality guideline was identified for comparison purposes and, consequently, the measured concentrations were compared to US EPA Region 3/6/9 values for residential sites available at: http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/Generic_Tables/pdf/master_sl_table_run_APRIL2009.pdf.

The maximum concentration of dieldrin in soil of 4.5 mg/kg while the US EPA Region 3/6/9 has indicated that a dieldrin soil concentration of 0.03 mg/kg is protective of a 1×10^{-6} Incremental Lifetime Cancer Risk (ILCR); however, it is noted that an ILCR of 1×10^{-5} is considered to be acceptable by Health Canada. Consequently, it is possible that some upward adjustment of the US EPA Region 3/6/9 value is considered to be acceptable (see Section 4.6).

Overall, it is proposed that dieldrin would advance to the quantitative HHRA. All other chemicals were found to be less than detection limits and, consequently, no further evaluation is considered to be necessary for these other chemicals.

4.2.2. Sediments

Screening of chemicals in sediments for evaluation in a quantitative HHRA is complicated for reasons that include:

- None of the sediment guidelines available are specifically developed with consideration of direct contact by people (incidental ingestion and dermal contact).
- Most sediment guidelines available have not been developed to ensure that fish can be safely consumed by people.
- Use of soil guidelines is not directly applicable since:
    - In some cases, exposure to chemicals in sediments could be greater than from soils since the wetness of sediments indicates greater adherence to skin and thus, potentially greater dermal and ingestion exposures.

- In other cases, exposures to chemicals in sediments could be less than from soils since the opportunity to directly contact sediments will be much less than soils due to the relatively small amount of time that people may contact such sediments (especially when submerged).

Consequently, it was not possible to identify chemicals for evaluation via a direct screening of chemicals.

Instead, it is proposed that the chemicals evaluated will be those that have been detected in sediment. At the current time, this list includes:

- Chlordane
- DDE
- Dichlofluanid
- Heptachlor
- Heptachor epoxide
- Hexachlorobenzene
- Pentachloronitrobenzene
- Profenophos
- Propazine

It is proposed that all of these chemicals would be evaluated in the quantitative HHRA (unless it can be shown that these chemicals are not elevated above background concentrations).

4.3. Human Receptors of Potential Concern

The quantitative HHRA would evaluate future use of the site for residential purposes. Future use of the site may include the following types of people being present at the site:

1) Residential receptors: Members of the public of all ages. Because the site is planned to be used for cottages, it would be assumed that persons would be present 7 days per week, 8 months per year for 30 years.

2) Recreational receptors: Members of the general public who may use the site for recreational purposes.

A final receptor that was considered but ultimately not included was excavation workers. It is considered unlikely that excavation work would occur without a worker health and safety plan that would include vapour monitoring. Consequently, such workers were not considered to be necessary to evaluate in the HHRA.

4.4. Exposure Pathways of Potential Concern

Under future site conditions, it appears that direct contact with soil and sediment could occur at the site for persons spending time at the site. The inhalation of outdoor air would also occur at the site. Finally, consumption of fish could occur.

It is considered unlikely that edible plants would accumulate dieldrin from the soil at appreciable amounts. Chlorinated pesticides are not known to be greatly accumulated in plants and, thus, their use on crops has been permitted. Nevertheless, it is recommended that a literature review would be completed to determine if the concentrations of dieldrin are known to pose problems. Consequently, additional site information on the plants and potentially chemical analysis of edible portions of the plants may be required to provide comments on this pathway; however, the literature review may indicate that collection of such information is unnecessary. Such information would be used to address exposures from both consumption of wild plants (e.g., berries) and future home garden produce.

It is not known if edible fish are impacted by site conditions. It is recommended that that this pathway be re-visited after conclusions are available on the concentrations of the chemicals of concern identified in fish.

Finally, exposure pathways that do not require evaluation include:

- There is no environmental data to indicate that the site has resulted in chemical impacts in drinking water wells (either currently or into the future). Nevertheless, should the site be developed in the future and groundwater used as a drinking water source, individual wells should be tested and analyzed against applicable criteria prior to use.

- As discussed in the ecological risk assessment problem formulation, successive accumulation of chemicals in wild game is not anticipated to be an exposure pathway that requires quantitative evaluation.

It is stressed that additional site investigations are recommended and that the above exposure pathway analysis may need to be revisited. More specifically, as discussed in Section 5, data gaps that are recommended to be addressed include additional environmental sampling (see ecological risk assessment problem formulation).

It is recommended that the exposure pathway analysis should be re-confirmed after receipt of such data.

4.5. Preliminary Conceptual Model

Under the preliminary conceptual model, the receptors to be evaluated consist of residential and recreational receptors. The conceptual model for each of these receptors is discussed below.

It is noted that the proposed approach involves consideration of conservative assumptions that likely overestimate exposure and may be re-visited in the future if more detailed analyses are required. Use of a conservative approach is a standard manner for completion of HHRA. If risks are found to be acceptable using maximum case assumptions that likely overestimate risks, no further analyses are generally required. However, if unacceptable risks are predicted, it is generally considered to be acceptable to re-visit the risk assessment to determine if more sophisticated analyses or data may be required to refine conclusions.

4.5.1. Residential Receptors

The receptors and exposure pathways for residential receptors that will be evaluated are provided in Table E.

Table E: Proposed Receptors and Exposure Pathways to be Evaluated for Future Residential Receptors

Critical Receptors		Exposure Pathways	
	Infant	X	Soil/sediment ingestion
X	Toddler	X	Soil/sediment dermal absorption
	Child	X	Particulate inhalation
	Teen		Vapour inhalation of outdoor air
X	Adult		Vapour inhalation of indoor air

Critical Receptors		Exposure Pathways	
			Water dermal exposure
			Incidental water ingestion
		TBD	Plant ingestion
		X	Fish ingestion
			Wild game ingestion

X – Requires evaluation in the human health risk assessment
TBD – To be determined (the need to evaluate risks from on-site plants (i.e. vegetable gardens, berries, etc) will be dependent on whether or not edible plants will be present at impacted areas of site and whether these plants could accumulate COPCs)

4.5.2. Recreational Receptors

The receptors and exposure pathways for recreational receptors that will be evaluated are provided in Table F. The main difference between residential and recreational receptors will be the amount of time spent at the site.

Table F: Proposed Receptors and Exposure Pathways to be Evaluated for Future Recreational Land Use

Critical Receptors		Exposure Pathways	
	Infant	X	Soil/sediment ingestion
X	Toddler	X	Soil/sediment dermal absorption
	Child	X	Particulate inhalation
	Teen		Vapour inhalation of outdoor air
X	Adult		Vapour inhalation of indoor air
			Water dermal exposure
			Incidental water ingestion
		TBD	Plant ingestion
		X	Fish ingestion
			Wild game ingestion

X – Requires evaluation in the human health risk assessment
TBD – To be determined (the need to evaluate risks from on-site plants (i.e. vegetable gardens, berries, etc) will be dependent on whether or not edible plants will be present at impacted areas at the site and whether these plants could accumulate COPCs)

4.6. Preliminary Risk Analysis

4.6.1. Risks from Dieldrin in Soil

As indicated earlier, US EPA Region 3/6/9 (2009) has developed residential soil screening levels for dieldrin of 0.03 mg/kg whereas a maximum concentration of 4.5 mg/kg has been

reported in soil. According to Health Canada guidance, these values are permitted to be considered for screening purposes when a Canadian value is not otherwise available; however, Health Canada does recommend that the US EPA Region 3/6/9 values should be adjusted to account for a Hazard Quotient value of 0.2 for non-carcinogens (US EPA Region 3/6/9 values are based on a Hazard Quotient value of 1) and an Incremental Lifetime Cancer Risk (ILCR) estimate of 1×10^{-5} for carcinogens (US EPA Region 3/6/9 values are based on an ILCR of 1×10^{-6}).

Since dieldrin is considered to be a genotoxic carcinogen, the US EPA Region 3/6/9 values can be multiplied by a factor of 10 to estimate soil screening levels for protection of cancer risks at a level of 1×10^{-6}. Accordingly, residential soil screening levels for dieldrin of 0.3 mg/kg for protection of an ILCR of 1×10^{-5}.

In completing the above modification, it was necessary to ensure that non-cancer risks were also protected. According to US EPA Region 3/6/9, it is most often the case that the cancer endpoint is the most sensitive effect for protection; however, this statement needs to be verified for each chemical (especially if an ILCR of 1×10^{-5} is applied rather than an ILCR of 1×10^{-6}).

Parameter	Value	Reference
Receptor Parameters		
Soil ingestion rate for toddler	80 mg/day	Health Canada, 2004
Surface Area for Dermal Contact	Hands: 430 cm^2 Rest of Body: 2,600 cm^2	Health Canada, 2004
Soil Adherence Factor	Hands: 10 mg/cm^2 Rest of Body: 1 mg/cm^2	Health Canada, 2004
Body weight	16.5 kg	Health Canada, 2004
Exposure Time	1.0 (7 days per week, 52 weeks per year)	Health Canada, 2004
Chemical Parameters		
Relative dermal absorption	0.2	Health Canada (2007) value for DDT
Tolerable Daily Intake	0.05 µg/kg bw/day for dieldrin	US EPA (2009)

Using the information provided above, a Hazard Quotient value of 0.034 was estimated for non-cancer endpoints for toddlers exposed to soil concentrations of dieldrin of 0.3 mg/kg, respectively (i.e., HQ < 0.2).

Based on the above, it would appear that the 10 times upward modification of the US EPA Region 3/6/9 residential soil screening levels for dieldrin of 0.3 mg/kg is protective of ILCR

estimates of 1 x 10^{-5} and Hazard Quotient values of 0.2. Consequently, this modified soil screening level is considered to be suitable for evaluation of risks.

In summary, a soil concentration of 0.3 mg/kg is considered to be appropriate for screening of chemicals for protection of human health from dieldrin. It is recommended that a more formal risk evaluation process should be completed before making final conclusions. A more formal analysis will be able to consider:

- Statistical distribution of the soil data (rather than just individual maximum results);
- More fully utilize a Health Canada approach to risk assessment; and
- Consider site-specific aspects such as expected fraction of the year spent at the site, any planned risk management measures (e.g., reduced access to certain areas via fencing), etc.

4.6.2. Pesticides in Sediment

As noted earlier, a variety of pesticides have been identified in sediment. It is not possible to provide a preliminary estimate of human health risks from these pesticides in sediments. To evaluate the risks from the pesticides in sediment, it will be necessary to estimate:

- The rate of direct contact with sediments (i.e., incidental ingestion and dermal contact by people).
- The rate of exposure via the food chain (i.e., fish).

At the current time, there is not sufficient information to estimate exposure from either of these main sources of potential exposures. Consequently, preliminary estimates of risks cannot be provided from the pesticides occurring in sediments.

5. RISK ASSESSMENT SAMPLING AND ANALYSIS PLAN

The ecological and human health problem formulations outlined the chemicals of potential concern, receptors of concern, and exposure pathways that are operational at the site. Additional information that would be required to conduct a human health and ecological risk assessment was identified during the problem formulation process and is presented below:

- Collection of fish fillets and whole fish from Oxley's Pond, Pond K, Pond J and a reference pond for the analysis of pesticides and lipids. Target fish species for sampling and analysis would be mature, consumable-sized trout;
- Confirmation of the aquatic and terrestrial habitat in the vicinity of the COPC detections in soil and sediment; and
- Collection of surficial sediment (0 to 5 cm) by sediment cores for laboratory toxicity bioassays for aquatic invertebrates and fish fry as well as analysis of pesticides and organic carbon.

The additional information is necessary to determine the potential risk the current level of pesticides in soil and sediment at the site may pose to ecological and human receptors. A detailed sampling plan and cost estimate will be prepared as a separate report in consultation with DOEC.

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7. GENERAL LIMITATIONS AND CONFIDENTIALITY

This report has been prepared by SNC-Lavalin Environment Inc. (SLEI), for the exclusive use of Newfoundland and Labrador Department of Environment and Conservation (DOEC), who has been party to the development of the scope of work for this project and understands its limitations.

This report is intended to provide information to DOEC to assist it in making business decisions. SLEI is not a party to the various considerations underlying the business decisions, and does not make recommendations regarding such business decisions. In providing this report, SLEI accepts no liability or responsibility in respect of the Site described in this report or for any business decisions relating to the Site, including decisions in respect of the purchase, sale or investment in the Site.

Any use, reliance on, or decision made by a third party based on this report is the sole responsibility of such third party. SLEI accepts no liability or responsibility for any damages that may be suffered or incurred by any third party as a result of the use of, reliance on, or any decision made based on this report.

The findings, conclusions, and recommendations in this report have been developed in a manner consistent with the level of skill normally exercised by environmental professionals currently practising under similar conditions in the area. The findings contained in this report are based, in part, upon information provided by others. If any of the information is inaccurate, modifications to the findings, conclusions, and recommendations may be necessary.

The findings, conclusions, and recommendations presented by SLEI in this report reflect SLEI's best judgement based on the Site conditions at the time of the Site inspection on the date(s) set out in this report and on information available at the time of preparation of this report. They have been prepared for specific application to this site and are based, in part, upon visual observation of the Site, subsurface investigation at discrete locations and depths, and specific analysis of specific materials as described in this report during a specific time interval. The findings cannot be extended to previous or future site conditions or to portions of the Site which were unavailable for direct observation, subsurface locations which were not investigated directly, or materials or analysis which were not specified. Substances other than those

described may exist within the Site, reported substance parameters may exist in areas of the site not investigated, and concentrations of substances greater or less than those reported may exist between sample locations.

The findings and conclusions of this report are valid only as of the date of this report. If Site conditions change, new information is discovered, or unexpected Site conditions are encountered in future work, including excavations, borings, or other studies, SLEI should be requested to re-evaluate the findings, conclusions and/or recommendations of this report, and to provide amendments as required.

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TABLES

Table 2-1: Summary of Analytical Results for Sediment (mg/kg dry weight)

Pond ID:	Detection Limit	Guidelines	Pond A	Pond B		Pond C	Pond D		Pond E		Oxley's Pond		Pond F		Oxley's Second Pond	Pond G	Little Gull Pond				Pond H	Pond I		
Sample ID:			SED-1	SED-2	SED-3	SED-4	SED-5	SED-6	SED-7	SED-8	SED-9	SED-25	SED-10	SED-11	SED-12	SED-13	SED-14	SED-15	SED-22	SED-23	SED-16	SED-17	SED-17-A	SED-18
Date:			19-Mar-09	19-Mar-09	19-Mar-09	19-Mar-09	19-Mar-09	19-Mar-09	19-Mar-09	19-Mar-09	19-Mar-09	19-Mar-09	19-Mar-09	19-Mar-09	19-Mar-09	19-Mar-09	19-Mar-09	19-Mar-09	19-Mar-09	19-Mar-09	19-Mar-09	19-Mar-09	27-Aug-09	19-Mar-09
Lab ID:			L746448-1	L746448-2	L746448-3	L746448-4	L746448-5	L746448-6	L746448-7	L746448-8	L746448-9	L746448-25	L746448-10	L746448-11	L746448-12	L746448-13	L746448-14	L746448-15	L746448-22	L746448-23	L746448-16	L746448-17	L812792-13	L746448-18
Sample Type:			Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment
Lab Duplicate of:												SED-9												
Acephate	0.01	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Alachlor	0.001	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Aldrin	0.0005	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00055	0.00108	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050
Aspon	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Atrazine	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Azinphos Ethyl	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Guthion	0.005	--	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Benfluralin	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
a-BHC	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
b-BHC	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
d-BHC	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Bromacil	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Bromophos	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Butylate	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Captan	0.005	--	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0010	<0.0050	<0.0010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Carbophenothion	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Chlorbenside	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
a-chlordane	0.001	0.00450[1*]	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
g-chlordane	0.001	0.00450[1*]	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Chlorfenson (Ovex)	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Chlorfenvinphos	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Chlormephos	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Chlorothalonil	0.005	--	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Chlorpropham	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Chlorpyrifos	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Chlorpyrifos Methyl	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Chlorthiophos	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Cyanophos	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Cyanazine	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Dacthal	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
2,4'-DDD	0.001	0.00354[1**]	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
4,4'-DDD	0.001	0.00354[1**]	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
2,4'-DDE	0.001	0.00142[1***]	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
4,4'-DDE	0.001	0.00142[1***]	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
2,4'-DDT	0.001	0.00119[1****]	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
4,4'-DDT	0.001	0.00119[1****]	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Demeton	0.005	--	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Desmetryn	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Diallate	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Diazinon	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Dichlobenil	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Dichlofluanid	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0075	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Dichloran	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Dichlofenthion	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Dichlorvos + Naled	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Dicofol	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Dicrotophos	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Dieldrin	0.0005/002[2]	0.00285[1]	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	<0.00050
Dimethoate	0.005	--	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Dioxathion	0.005	--	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Diphenylamine	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Disulfoton	0.005	--	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Endosulfan I	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Endrin Aldehyde	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Endosulfan II	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Endosulfan Sulfate	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Endrin	0.001	0.00267[1]	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Endrin Ketone	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
EPN	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Eptam	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Ethalfluralin	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Ethion	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Desethyl Atrazine	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Bromophos-ethyl	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Pirimiphos-ethyl	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Parathion	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Fenitrothion	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010

Table 2-1: Summary of Analytical Results for Sediment (mg/kg dry weight)

Pond ID:	Detection Limit	Guidelines	Pond A	Pond B		Pond C	Pond D		Pond E		Oxley's Pond		Pond F		Oxley's Second Pond	Pond G	Little Gull Pond				Pond H	Pond I		
Sample ID:			SED-1	SED-2	SED-3	SED-4	SED-5	SED-6	SED-7	SED-8	SED-9	SED-25	SED-10	SED-11	SED-12	SED-13	SED-14	SED-15	SED-22	SED-23	SED-16	SED-17	SED-17-A	SED-18
Date:			19-Mar-09	19-Mar-09	19-Mar-09	19-Mar-09	19-Mar-09	19-Mar-09	19-Mar-09	19-Mar-09	19-Mar-09	19-Mar-09	19-Mar-09	19-Mar-09	19-Mar-09	19-Mar-09	19-Mar-09	19-Mar-09	19-Mar-09	19-Mar-09	19-Mar-09	19-Mar-09	27-Aug-09	19-Mar-09
Lab ID:			L746448-1	L746448-2	L746448-3	L746448-4	L746448-5	L746448-6	L746448-7	L746448-8	L746448-9	L746448-25	L746448-10	L746448-11	L746448-12	L746448-13	L746448-14	L746448-15	L746448-22	L746448-23	L746448-16	L746448-17	L812792-13	L746448-18
Sample Type:			Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment
Lab Duplicate of:												SED-9												
Fensulfothion	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Fenthion	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Folpet	0.005	--	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Fonofos	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Heptachlor	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Heptachlor epoxide	0.001	0.0006[1]	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Hexachlorobenzene	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Hexazinone	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Iodofenphos	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Iprodione	0.005	--	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Isofenphos	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Lindane (gamma - BHC)	0.001	0.00094[1]	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Malaoxon	0.005	--	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Malathion	0.005	--	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Metalaxyl	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Methamidophos	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Methidathion	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Methoxychlor	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Pirimiphos-methyl	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Parathion Methyl	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Metolachlor	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Metribuzin	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Mevinphos	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Mirex	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Nitrofen	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Omethoate	0.005	--	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Pentachloronitrobenzene	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Permethrin	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Phorate	0.005	--	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Phosalone	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Phosmet	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Phosphamidon	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Pirimicarb	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Procymidone	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Profenophos	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Profluralin	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Prometryn	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Pronamide	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Propazine	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Propiconazole	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Pyrazophos	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Quinalphos	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Ronnel	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Simazine	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Stirophos	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Sulfotepp	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Terbufos	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Terbuthylazine	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Terbutryne	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Tecnazene	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Tetradifon	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Tolyfluanid	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Triadimefon	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Triallate	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Trifluralin	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Vinclozolin	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010

[1] Federal - Canadian Council of the Ministers of the Environment (CCME): Canadian Sediment Quality Guidelines for the Protection of Aquatic Life (2007)

[2] ALS achieved an RDL of .0005 during the March sampling program and .002 in the September program.

*Guideline for Total Chlordane (Sum of a-chlordane and g-chlordane)

**Guideline for Total DDD (Sum of 2,4 DDD and 4,4 DDD)

***Guideline for Total DDE (Sum of 2,4 DDE and 4,4 DDE)

****Guideline for Total DDT (Sum of 2,4 DDT and 4,4 DDT)

Shaded Grey Areas exceed one or more applicable guidelines

-- no applicable guideline

Table 2-1: Summary of Analytical Results for Sediment (mg/kg dry weight)

Pond ID:			Pond J			Pond K													Pond L
Sample ID:	Detection Limit (mg/kg)	Guidelines	SED-19	SED-21	SED-21-A	SED-20	SED-20-A	SED-20-B	SED-20-C	SED-20-D	SED-20-E	SED-20-F	SED-20-G	SED-20-H	SED-20-I	SED-20-J	SED-20-K	SED-24
Date:			19-Mar-09	19-Mar-09	27-Aug-09	19-Mar-09	27-Aug-09	27-Aug-09	27-Aug-09	27-Aug-09	27-Aug-09	27-Aug-09	27-Aug-09	27-Aug-09	27-Aug-09	27-Aug-09	27-Aug-09	19-Mar-09
Lab ID:			L746448-19	L746448-21	L812792-12	L746448-20	L812792-1	L812792-2	L812792-3	L812792-4	L812792-5	L812792-6	L812792-7	L812792-8	L812792-9	L812792-10	L812792-11	L746448-24
Sample Type:	Sediment		Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment
Lab Duplicate of:																		
Acephate	0.01	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Alachlor	0.001	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Aldrin	0.0005	-	<0.00050	<0.00050	<0.0050	0.00111	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.00050
Aspon	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Atrazine	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Azinphos Ethyl	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Guthion	0.005	--	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Benfluralin	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
a-BHC	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
b-BHC	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
d-BHC	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Bromacil	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Bromophos	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Butylate	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Captan	0.005	--	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Carbophenothion	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Chlorbenside	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
a-chlordane	0.001	0.00450[1*]	<0.0010	<0.0010	<0.0010	0.0027	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
g-chlordane	0.001	0.00450[1*]	<0.0010	<0.0010	<0.0010	0.0023	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Chlorfenson (Ovex)	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Chlorfenvinphos	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Chlormephos	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Chlorothalonil	0.005	--	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Chlorpropham	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Chlorpyrifos	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Chlorpyrifos Methyl	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Chlorthiophos	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Cyanophos	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Cyanazine	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Dacthal	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
2,4'-DDD	0.001	0.00354[1**]	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
4,4'-DDD	0.001	0.00354[1**]	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
2,4'-DDE	0.001	0.00142[1***]	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
4,4'-DDE	0.001	0.00142[1***]	<0.0010	<0.0010	<0.0010	0.0016	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
2,4'-DDT	0.001	0.00119[1****]	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
4,4'-DDT	0.001	0.00119[1****]	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Demeton	0.005	--	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Desmetryn	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Diallate	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Diazinon	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Dichlobenil	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Dichlofluanid	0.001	--	0.0078	<0.0010	<0.0010	0.0015	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Dichloran	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Dichlofenthion	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Dichlorvos + Naled	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Dicofol	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Dicrotophos	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Dieldrin	0.0005/002[2]	0.00285[1]	<0.00050	<0.00050	<0.0020	<0.00050	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.00050
Dimethoate	0.005	--	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Dioxathion	0.005	--	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Diphenylamine	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Disulfoton	0.005	--	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Endosulfan I	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Endrin Aldehyde	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Endosulfan II	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Endosulfan Sulfate	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Endrin	0.001	0.00267[1]	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Endrin Ketone	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
EPN	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Eptam	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Ethalfluralin	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Ethion	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Desethyl Atrazine	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010

Table 2-1: Summary of Analytical Results for Sediment (mg/kg dry weight)

Pond ID:			Pond J			Pond K												Pond L
Sample ID:	Detection Limit (mg/kg)	Guidelines	SED-19	SED-21	SED-21-A	SED-20	SED-20-A	SED-20-B	SED-20-C	SED-20-D	SED-20-E	SED-20-F	SED-20-G	SED-20-H	SED-20-I	SED-20-J	SED-20-K	SED-24
Date:			19-Mar-09	19-Mar-09	27-Aug-09	19-Mar-09	27-Aug-09	27-Aug-09	27-Aug-09	27-Aug-09	27-Aug-09	27-Aug-09	27-Aug-09	27-Aug-09	27-Aug-09	27-Aug-09	27-Aug-09	19-Mar-09
Lab ID:			L746448-19	L746448-21	L812792-12	L746448-20	L812792-1	L812792-2	L812792-3	L812792-4	L812792-5	L812792-6	L812792-7	L812792-8	L812792-9	L812792-10	L812792-11	L746448-24
Sample Type:			Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment
Lab Duplicate of:																		
Bromophos-ethyl	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Pirimiphos-ethyl	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Parathion	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Fenitrothion	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Fensulfothion	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Fenthion	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Folpet	0.005	--	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Fonofos	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Heptachlor	0.001	--	<0.0010	<0.0010	<0.0010	0.0067	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Heptachlor epoxide	0.001	0.0006[1]	<0.0010	<0.0010	<0.0010	0.0036	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Hexachlorobenzene	0.001	--	<0.0010	<0.0010	<0.0010	0.0012	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Hexazinone	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Iodofenphos	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Iprodione	0.005	--	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Isofenphos	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Lindane (gamma - BHC)	0.001	0.00094[1]	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Malaoxon	0.005	--	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Malathion	0.005	--	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Metalaxyl	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Methamidophos	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Methidathion	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Methoxychlor	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Pirimiphos-methyl	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Parathion Methyl	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Metolachlor	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Metribuzin	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Mevinphos	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Mirex	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Nitrofen	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Omethoate	0.005	--	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Pentachloronitrobenzene	0.001	--	<0.0010	<0.0010	<0.0010	0.0014	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Permethrin	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Phorate	0.005	--	<0.0010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Phosalone	0.001	--	<0.0050	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Phosmet	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Phosphamidon	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Pirimicarb	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Procymidone	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Profenophos	0.001	--	0.0018	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Profluralin	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Prometryn	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Pronamide	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Propazine	0.001	--	0.0034	<0.0010	<0.0010	0.0023	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Propiconazole	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Pyrazophos	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Quinalphos	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Ronnel	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Simazine	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Stirophos	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Sulfotepp	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Terbufos	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Terbuthylazine	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Terbutryne	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Tecnazene	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Tetradifon	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Tolyfluanid	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Triadimefon	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Triallate	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Trifluralin	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Vinclozolin	0.001	--	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010

[1] Federal - Canadian Council of the Ministers of the Environment (CCME): Canadian Sediment Quality Guidelines for the Protection of Aquatic Life (2007)

[2] ALS achieved an RDL of .0005 during the March sampling program and .002 in the September program.

*Guideline for Total Chlordane (Sum of a-chlordane and g-chlordane)

**Guideline for Total DDD (Sum of 2,4 DDD and 4,4 DDD)

***Guideline for Total DDE (Sum of 2,4 DDE and 4,4 DDE)

****Guideline for Total DDT (Sum of 2,4 DDT and 4,4 DDT)

Shaded Grey Areas exceed one or more applicable guidelines

-- no applicable guideline

Table 3-1.Vertebrate Species Present in Newfoundland.

Common name	*Species name*	Salmonier	Resident in Newfoundland				Habitat Preference																					Breeding Habitat																							
		Potentially Present on Site: Likely: L, Unlikely: U, Not present: -	Permanent	Summer Resident	Winter Resident	COSEWIC and Governement of Newfoundland and Labrador Listings	Forest	Open Forest	Forest edge/ Riparian	Grassland with trees/ Farmland/ Orchards	Bushes/ Shrubs/ Thickets/	Scrub with thorns	Open landscapes/ tundra/ grassland/ savanna/ coastal ponds & sloughs/coastal wetlands/ salt	Semidesert	Desert	Lakes/ Rivers/ Riparian/ Sandspits/ Mudflats/ Ponds	Upland Streams/ Riparian	Open Sea/ low flat islands	Open Sea deep water	Rocky or sandy sea shore/ Bay islands/ Coastal Islands/ Shallow coastal habitat/ Coastal bays/ Coastal mangroves/ Tidal flats/ Sand spits/ Mud flats	Freshwater marshes/ Swamps	Rocky outcrops/ cliffs	Mountains/ Canyons	Bank	Building	Bridge	Cave	Chimney	Cliff	Confier	Deciduous	Floating	Grass	Gravel Roof	Hollow Log	Man-made	Pebbles	Reed/ Cattails	Shrub	Snag	Bare Soil	Stump
Amphibians																																																	
Green frog	*Rana clamitans*	*L*	x													3	2					1																										
Leopard frog	*Rana pipiens*	*L*	x													3	2					1																										
Chorus frog	*Pseudacris maculata*	*L*	x													3	2					1																										
American toad	*Bufo americanus*	*L*	x													3	2					1																										
Reptiles																																																
None																																																
Birds																																																
Common loon	*Gavia immer*	*U*		x	x	*Not at risk*										1				2																								1		
Yellow-nosed albatross	*Thalassarche chlororhynchos*	-		x														1			2																								3		
Northern fulmar	*Fulmarus glacialis*	-	x															1					2																								
Greater shearwater	*Puffinus gravis*	-		x														1					2																								
Sooty shearwater	*Puffinus griseus*	-		x														1					2																								
Manx shearwater	*Puffinus puffinus*	-		x														1								1																			3		
Wilson's Storm-petrel	*Oceanites oceanus*	-		x														1					2																						1		
Leach's storm-petrel	*Oceanodroma leucorhoa*	-		x														1			2					1																				
Northern Gannet	*Morus bassanus*	-	x															1			3		2																						1		
Double-crested cormorant	*Phalacrocorax auritus*	*U*		x		*Not at risk*										1				2		3		3							1		2										4		
Great Cormorant	*Phalacrocorax carbo*	-		x	x													3		2		1		2							1												3		
American bittern	*Botaurus lentiginosus*	*U*		x												2					1																									
Little egret	*Egretta garzetta*	*U*		x																	1																									
Pink-footed goose	*Anser brachyrhynchus*	*U*		x						3			1									2																								
Canada goose	*Branta canadensis*	*L*		x									2			3					1											5				2	4		6	1	3					
American wigeon	*Anas americana*	-		x									3			2					1															1									
American black duck	*Anas rubripes*	*L*		x												1	2				3			1											2		5		4				3	
Mallard	*Anas platyrhynchos*	*L*		x						3						1					2															1		4		2				3	
Blue-winged teal	*Anas discors*	-		x												2					1															2				3			1		
Northern shoveler	*Anas clypeata*	-		x												2					1															1									
Northern pintail	*Anas acuta*	-		x									2			3					1															1				2					
Green-winged teal	*Anas crecca*	*U*		x									2			1																				1				2					
Ring-necked duck	*Aythya collaris*	*U*		x												2					1															1				2					
Tufted duck	*Aythya fuligula*	*L*			x											1	2				3															1					2				
Greater scaup	*Aythya marila*	-			x											1				2															2	1								
King eider	*Somateria spectabilis*	*U*			x								1					3		2															2							1		
Common eider	*Somaertia mollissima*	*U*	x	x									2							1											3				1			2						
Harlequin duck	*Histrionicus histrionicus*	-			x	*Special concern (COSEWIC), Vulnerable (Provincial Designation)*											2			1												2								1				
White-winged scoter	*Melanitta fusca*	*U*			x											1		2																	1							2		
Long-tailed duck	*Clangula hyemalis*	*U*			x								1			2		4		3															1					2				
Bufflehead	*Bucephala albeola*	-			x											1																				3	2			4			1		
Common goldeneye	*Bucephala clangula*	*U*	x													1				2																3	2			4			1		
Common merganser	*Mergus merganser*	*U*		x			1									2				3					4										2	1						3		
Red-breasted merganser	*Mergus serrator*	*U*			x								4			3				2	1														2					4		1	3
Osprey	*Pandion haliaetus*	*U*		x												1				2					5										2	1			3				4		
Bald eagle	*Haliaeetus leucocephalus*	*U*	x			*Not at risk*										1				2															3	2	1						4		
Northern harrier	*Circus cyaneus*	*U*		x		*Not at risk*							1																						1					2				

Table 3-1.Vertebrate Species Present in Newfoundland.

Common name	Species name	Salmonier	Resident in Newfoundland				Habitat Preference																	Breeding Habitat																		
		Potentially Present on Site: Likely: L, Unlikely: U, Not present: -	Permanent	Summer Resident	Winter Resident	COSEWIC and Governement of Newfoundland and Labrador Listings	Forest	Open Forest	Forest edge/ Riparian	Grassland with trees/ Farmland/ Orchards	Bushes/ Shrubs/ Thickets/	Scrub with thorns	Open landscapes/ tundra/ grassland/ savanna/ coastal ponds & sloughs/ coastal wetlands/ salt	Semidesert	Desert	Lakes/ Rivers/ Riparian/ Sandspits/ Mudflats/ Ponds	Upland Streams/ Riparian	Open Sea/ low flat islands	Open Sea deep water	Rocky or sandy sea shore/ Bay islands/ Coastal Islands/ Shallow coastal habitat/ Coastal bays/ Coastal mangroves/ Tidal flats/ Sand spits / Mud flats	Freshwater marshes/ Swamps	Rocky outcrops/ cliffs	Mountains/ Canyons	Bank	Building	Bridge	Cave	Chimney	Cliff	Confier	Deciduous	Floating	Grass	Gravel Roof	Hollow Log	Man-made	Pebbles	Reed/ Cattails	Shrub	Snag	Bare Soil	Stump
Sharp-shinned hawk	*Accipiter striatus*	*U*	x	x		*Not at risk*	1	2		3																				1	2											
Northern goshawk	*Accipiter gentilis*	*U*	x			*Not at risk*	1	2																						2	1											
Rough-legged hawk	*Buteo lagopus*	*L*		x		*Not at risk*				2	4		1								3			2					1													
American kestrel	*Falco sparverius*	-		x					1	2	3		4	5	6										4				2		1					3				5		
Merlin	*Falco columbarius*	*U*		x		*Not at risk*		2					1																4	3	2									1		
Gyrfalcon	*Falco rusticolus*	*U*			x	*Not at risk*							3			1		2				4							1													
Ruffed grouse	*Bonasa umbellus*	*U*	x				1																																2		3	1
Spruce grouse	*Dendragapus canadensis*	*U*	x				1																																		1	
Willow ptarmigan	*Lagopus lagopus*	*U*	x								1		2																				3				2		4		1	
Rock ptarmigan	*Lagopus mutus*	-	x										1																												1	
Common moorhen	*Gallinula chloropus*	*U*		x												2					1									3	2								1			
Northern lapwing	*Vanellus vanellus*	-		x						1																							1								2	
Semipalmated plover	*Charadrius semipalmatus*	*U*		x									3			2				1																	1				2	
Eurasian oystercatcher	*Haematopus ostralegus*	*U*		x												2				1													3				2				1	
Greater yellowlegs	*Tringa melanoleuca*	*L*		x									1			3					2												2								1	
Common redshank	*Tringa totanus*	-		x									1								2												1									
Spotted redshank	*Tringa erythropus*	*L*			x			2					1							4	3																				1	
Willet	*Catoptrophorus semipalmatus*	-		x																1	2												1									
Black-tailed godwit	*Limosa limosa*	*U*		x						1						2				3													1					2				
Least sandpiper	*Calidris minutilla*	*L*		x				1					2							4	3												1								2	
Purple sandpiper	*Calidris maritima*	*U*			x								1							2																	2				1	
Common snipe	*Gallinago gallinago*	*L*		x									3			1					2												2					3			1	
Eurasian woodcock	*Scolopax rusticola*	*L*			x		1	2					3																				2								1	3
American woodcock	*Scolopax minor*	-		x				1	2	3																							1						3			2
Great skua	*Stercorarius skua*	-			x								2					1						1																	2	
South Polar skua	*Catharacta maccormicki*	-		x									3					1		2				1																	2	
Common black-headed gull	*Larus ridibundus*	*U*			x											3		4		1	2												2					3			1	
Ring-billed gull	*Larus delawarensis*	*U*		x						3						1				2													1				3		4		2	
Herring gull	*Larus argentatus*	*U*	x	x						3						2				1				2						4				5					3		1	
Yellow-legged gull	*Larus cachinnans*	*U*			x					3						2				1				3										4			2				1	
Iceland gull	*Larus glaucoides*	-			x															1		2							1													
Glaucous gull	*Larus hyperboreus*	*U*			x											2				1		3							2								3				1	
Great black-backed gull	*Larus marinus*	*U*	x													2				1									2												1	
Black-legged kittiwake	*Rissa tridactyla*	-	x															1				2			4		3		1												2	
Ivory gull	*Pagophila eburnea*	-			x	*Endangered (COSEWIC), Vulnerable (provincial designation)*												1		2		3							1								2					
Caspian tern	*Sterna caspia*	-		x												1				2	3																2				1	
Common tern	*Sterna hirundo*	*U*		x				2								1		3		4													3				2				1	
Arctic tern	*Sterna paradisaea*	*U*		x									1			3		4		2													3				2				1	
Dovekie	*Alle alle*	-			x													3		2		1							1													
Common murre	*Uria aalge*	-	x	x	x													3		2		1							1													
Thick-billed murre	*Uria lomvia*	-	x		x													1				2							1													
Razorbill	*Alca torda*	-	x		x													1				2							1													
Black guillemot	*Cepphus grylle*	-	x	x	x													1				2							1												2	
Atlantic puffin	*Fratercula arctica*	-	x	x	x													1		3		2							2				3								1	
Rock dove	*Columba livia*	*U*	x							2												1			1	3			4					2			5					
Great horned owl	*Bubo virginianus*	*L*	x				1						3				2								2				5	6	7					3				4		1

Table 3-1.Vertebrate Species Present in Newfoundland.

Common name	Species name	Salmonier	Resident in Newfoundland				Habitat Preference																	Breeding Habitat																		
		Potentially Present on Site: Likely: L, Unlikely: U, Not present: -	Permanent	Summer Resident	Winter Resident	COSEWIC and Government of Newfoundland and Labrador Listings	Forest	Open Forest	Forest edge/ Riparian	Grassland with trees/ Farmland/ Orchards	Bushes/ Shrubs/ Thickets/	Scrub with thorns	Open landscapes/ tundra/ grassland/ savanna/ coastal ponds & sloughs/coastal wetlands/ salt	Semidesert	Desert	Lakes/ Rivers/ Riparian/ Sandspits/ Mudflats/ Ponds	Upland Streams/ Riparian	Open Sea/ low flat islands	Open Sea deep water	Rocky or sandy sea shore/ Bay islands/ Coastal Islands/ Shallow coastal habitat/ Coastal bays/ Coastal mangroves/ Tidal flats/ Sand spits / Mud flats	Freshwater marshes/ Swamps	Rocky outcrops/ cliffs	Mountains/ Canyons	Bank	Building	Bridge	Cave	Chimney	Cliff	Confier	Deciduous	Floating	Grass	Gravel Roof	Hollow Log	Man-made	Pebbles	Reed/ Cattails	Shrub	Snag	Bare Soil	Stump
Snowy owl	*Nyctea scandiaca*	*U*			x	*Not at risk*							1							3	2			4					3								2				1	
Northern hawk owl	*Surnia ulula*	*L*	x			*Not at risk*	2	1				3									4									2										1		
Short-eared owl	*Asio flammeus*	*U*		x		*Special concern (COSEWIC), Vulnerable (Provincial Designation)*							1								2												1					2				
Boreal owl	*Aegolius funereus*	*U*	x			*Not at risk*	1														2									2						3				1		
Belted kingfisher	*Ceryle alcyon*	*U*		x												1				2				1																		
Yellow-bellied sapsucker	*Sphyrapicus varius*	*U*		x				1	2																						1											
Downy woodpecker	*Picoides pubescens*	*L*	x				2	1	3																					3	2					4				1		
Hairy woodpecker	*Picoideus villosus*	*U*	x				2	1																						3	2									1		
Three-toed woodpecker	*Picoides tridactylus*	*U*	x					1	2			4											3							2												1
Black-backed woodpecker	*Picoides arcticus*	*U*	x				1	2	3														4							1	2									3		4
Northern flicker	*Colaptes auratus*	*L*		x				1	3	2																				3	2					4				1		
Olive-sided flycatcher	*Contopus borealis*	*U*		x		*Threatened*	2																1							1												
Yellow-bellied flycatcher	*Empidonax flaviventris*	*L*		x			1	3	2		4																								3						1	2
Alder flycatcher	*Empidonax alnorum*	*U*		x					1		2																			3	2								1			
Least flycatcher	*Empidonax minimus*	-		x				1	2																					3	1								2			
Northern shrike	*Lanius excubitor*	*L*			x			1	2	4	5										3									1									2			
Solitary vireo	*Vireo solitarius*	-		x			1	2	3																					1	3								2			
Philadelphia vireo	*Vireo philadelphicus*	-		x				1	2		3																			1												
Gray jay	*Perisoreus canadensis*	*L*	x				1	2	3							4														1	2											
Blue jay	*Cyanocitta cristata*	*L*	x				1	2	3																					2	1								3			
American crow	*Corvus brachyrhynchos*	*L*	x					1	2	3			4				5													2	1					5			3		4	
Common raven	*Corvus corax*	*L*	x				5			4			1									2	3						1	2	3											
Horned lark	*Eremophila alpestris*	*U*	x	x						2			1																				2								1	
Tree swallow	*Tachycineta bicolor*	*L*		x				1	2				5			4					3				5					2	1					4						3
Bank swallow	*Riparia riparia*	-		x						2						1								1					2													
Barn swallow	*Hirundo rustica*	*L*		x						1			2	3		4								1	3	4	2		5													
Black-capped chickadee	*Parus atricapillus*	*L*	x				2	3	1		4																			2	1					5				3		4
Boreal chickadee	*Poecile hudsonica*	*L*	x				1	2	3																					3	4									2		1
Red-breasted nuthatch	*Sitta canadensis*	*U*	x				1	2																						1	2									3		4
Brown creeper	*Certhia americana*	*U*		x				1													3		2							1	3									2		4
Winter wren	*Troglodytes troglodytes*	*L*		x			1	2			3													5	4										3					1		2
Golden-crowned kinglet	*Regulus satrapa*	*L*	x	x			1	2																						1												
Ruby-crowned kinglet	*Regulus calendula*	*L*		x				1																						1												
Veery	*Catharus fuscescens*	-		x			2	1																							3								2		1	
Gray-cheecked thrush	*Catharus minimus*	*L*		x				1	3				2																	1	2								3			
Swainson's thrush	*Catharus ustulatus*	*L*		x			3	2	1		4																			1	2								3			
Hermit thrush	*Catharus guttatus*	*L*		x			1	2	3																					2	3										1	
Redwing	*Turdus iliacus*	-		x				1	2	3	4																			3	2								1			
American robin	*Turdus migratorius*	*L*		x			1	2	5	3	5		4												3					2	1					4						
European starling	*Sturnus vulgaris*	*L*	x					5		2			1			4					3				3					2	1					4				5		
American pipit	*Anthus spinoletta*	*U*		x									1							3			2										2								1	
Cedar waxwing	*Bombycilla cedrorum*	*U*		x				2	1																					1	2											
Tennessee warbler	*Vermivora peregrina*	*L*		x				2	1							4					3												2					3	4		1	
Nashville warbler	*Vermivora ruficapilla*	-		x				2	1		3										4												2								1	
Yellow warbler	*Dendroica petechia*	*U*		x					1	3	2																				2								1			

Table 3-1.Vertebrate Species Present in Newfoundland.																																										
		Salmonier	Resident in Newfoundland				Habitat Preference																	Breeding Habitat																		
Common name	***Species name***	**Potentially Present on Site: Likely: L, Unlikely: U, Not present: -**	Permanent	Summer Resident	Winter Resident	COSEWIC and Governement of Newfoundland and Labrador Listings	Forest	Open Forest	Forest edge/ Riparian	Grassland with trees/ Farmland/ Orchards	Bushes/ Shrubs/ Thickets/	Scrub with thorns	Open landscapes/ tundra/ grassland/ savanna/ coastal ponds & sloughs/coastal wetlands/ salt	Semidesert	Desert	Lakes/ Rivers/ Riparian/ Sandspits/ Mudflats/ Ponds	Upland Streams/ Riparian	Open Sea/ low flat islands	Open Sea deep water	Rocky or sandy sea shore/ Bay islands/ Coastal Islands/ Shallow coastal habitat/ Coastal bays/ Coastal mangroves/ Tidal flats/ Sand spits / Mud flats	Freshwater marshes/ Swamps	Rocky outcrops/ cliffs	Mountains/ Canyons	Bank	Building	Bridge	Cave	Chimney	Cliff	Confier	Deciduous	Floating	Grass	Gravel Roof	Hollow Log	Man-made	Pebbles	Reed / Cattails	Shrub	Snag	Bare Soil	Stump
Magnolia warbler	*Dendroica magnolia*	*U*		x				1	2																					1									2			
Yellow-rumped warbler	*Dendroica coronata*	*L*		x			1																							1												
Black-throated green warbler	*Dendroica virens*	*U*		x				1	2																					1	2											
Blackburnian warbler	*Dendroica fusca*	*U*		x			1	2																						1												
Palm warbler	*Dendroica palmarum*	*U*		x				1	2																					2											1	
Bay-breasted warbler	*Dendroica castanea*	-		x				1	2																					1	2								3			
Blackpoll warbler	*Dendroica striata*	*L*		x			1	2																						1												
Black-and-white warbler	*Mniotilta varia*	*U*		x			2	1																											3						1	2
American redstart	*Setophaga ruticilla*	*L*		x				1	3							2															1								2			
Ovenbird	*Seiurus aurocapillus*	-		x			1	2																																	1	
Northern waterthrush	*Seiurus noveboracensis*	*L*		x			2		3		4										1			2																	1	3
Mourning warbler	*Oporornis philadelphia*	*U*		x				1			3										2												2						3		1	
Common yellowthroat	*Geothlypis trichas*	-		x					4		3		2								1												1					3	4		2	
Wilson's warbler	*Wilsonia pusilla*	*U*		x				1	2		4										3												2						3		1	
Chipping sparrow	*Spizella passerina*	-		x					1	2			3																	1	2											
Savannah sparrow	*Passerculus sandwichensis*	*L*		x						2			1								3												2								1	
Fox sparrow	*Passerella iliaca*	*L*		x			1	2	5		4												3							3	4								2		1	
Song sparrow	*Melospiza melodia*	-		x					2	1	3		5				6				4									3								4	2		1	
Lincoln's sparrow	*Melospiza lincolnii*	*L*		x						3	1										4		2										1								2	
Swamp sparrow	*Melospiza georgiana*	*L*		x									2								1																	1	2			
White-throated sparrow	*Zonotrichia albicollis*	*L*		x			1	4	2		3																												1		2	
White-crowned sparrow	*Zonotrichia leucophrys*	-		x					2	1	3												4							3			2								1	
Dark-eyed junco	*Junco hyemalis*	*L*	x	x				1	2														3							3									2		1	
Snow bunting	*Plectrophenax nivalis*	*U*			x								1							3		2		3	5				1							4					2	
Rose-breasted grosbeak	*Pheucticus ludovicianus*	-		x				2	1																						1								2			
Red-winged blackbird	*Agelaius phoeniceus*	-		x						2	3					4					1										4		1					2	3			
Rusty blackbird	*Euphagus carolinus*	*L*		x		*Special concern*		2													1									1									2			
Common grackle	*Quiscalus quiscula*	-		x						5	1		2			4					3				6					1	2							3		5		4
Brown-headed cowbird	*Molothrus ater*	*L*		x				2	3	1																																
Common chaffinch	*Fringilla coelebs*	-		x				4	3	1	2																				2								1			
Pine grosbeak	*Pinicola enucleator*	*L*	x					1	2																					1									2			
Purple finch	*Carpodacus purpureus*	*L*	x				1		2		4												3							1	2											
Red crossbill	*Loxia curvirostra*	*U*	x					1																						1												
White-winged crossbill	*Loxia leucoptera*	*U*	x				1	2	3																					1												
Common redpoll	*Carduelis flammea*	*U*	x		x			2			3		1											2															1			
Hoary redpoll	*Carduelis hornemanni*	*L*			x				3		2		1																										1		2	
Pine siskin	*Carduelis pinus*	*U*	x				1				2																			1												
American goldfinch	*Carduelis tristis*	*L*	x					3		1			2			4														3	2								1			
Evening grosbeak	*Coccothraustes vespertinus*	*U*	x					1	2														3							1	2											
House sparrow	*Passer domesticus*	*L*	x					2	1	4			3												3						1					2			4	5		

Table 3-1.Vertebrate Species Present in Newfoundland.

Common name	*Species name*	Salmonier	Resident in Newfoundland				Habitat Preference																					Breeding Habitat																	
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Mammals																																												
Little brown bat	*Myotis lucifugus*	*U*	x													2	1										1		2														
Northern long-eared bat	*Myotis septentrionalis*	*L*	x				1	2	3								4										4		1		3									2		
Hoary bat	*Lasiurus cinereus*	*L*	x				1	2			5			4	3																										
Snowshoe hare	*Lepus americanus*	*L*	x				2	3			1																				1	2									
Arctic hare	*Lepus arcticus*	*U*	x								2		1																					2						1		
Masked shrew	*Sorex cinereus*	*L*	x					4	3				1										2																			
Eastern chipmunk	*Tamias striatus*	*L*	x					1	2		3																															
Red squirrel	*Tamiasciurus hudsonicus*	*U*	x				1	2																																	h
Beaver	*Castor canadensis*	*L*	x													3	1						2			2							1									
Meadow vole	*Microtus pennsylvanicus*	*L*	x						3				1										2		4									1								
Southern red-backed vole	*Clethrionomys gapperi*	*L*	x				3	4	1														2																		
Deer mouse	*Peromyscus maniculatus*	*L*	x				3	4			2		1																												
Muskrat	*Ondatra zibethicus*	*L*	x													2	4				3		1			2							1								
Norway rat	*Rattus norvegicus*	*U*	x							2			1														1														
House mouse	*Mus musculus*	*U*	x							2			1														1														
Coyote	*Canis latrans*	*U*	x								2		1																												
Arctic fox	*Alopex lagopus*	-	x										1																												
Red fox	*Vulpes vulpes*	*L*	x				3	4	5	2			1																												
Black bear	*Ursus americanus*	*L*	x			*Not at risk*	1	3	4														2		5																
Polar bear	*Ursus maritimus*	-	x	x		*Special concern (COSEWIC), Vulnerable (Provincial Designation)*							1																														
Harbor seal	*Phoca vitulina*	-	x			*Not at risk*												2		1																					
Ringed seal	*Pusa hispida*	-	x			*Not at risk*												1		2																					
Gray seal	*Halichoerus grypus*	-	x															2		1																					
Harp seal	*Pagophilus groenlandicus*	-	x															1		2																					
Bearded seal	*Erignathus barbatus*	-	x			*Data deficient*												1		2																					
Hooded seal	*Cystophora cristata*	-	x															1																							
Newfoundland Marten	*Martes americana atrata*	*U*	x			*Threatened (Provincial designation)*	1																																				
Ermine	*Mustela erminea*	*L*	x					1		5	2		3										4																		
Mink	*Mustela vison*	*L*	x													2	1						3																		
River otter	*Lontra canadensis*	*L*	x				5	6	4							2	1				3																				
Lynx	*Lynx canadensis*	*L*	x			*Not at risk*	1				4												3	2																	
Moose	*Alces alces*	*L*	x				1	4	5		3												2																		
Caribou	*Rangifer tarandus*	*L*	x				3	2					1																												
North Atlantic right whale	*Eubalaena glacialis*	-	x															1																							
Sperm whale	*Physeter catodon*	-	x			*Not at risk*												2	1																					
Humpback whale	*Megaptera novaeangliae*	-	x															1	2																					
Blue whale	*Balaenoptera musculus*	-	x			*Endangered*												2	1																					
Fin whale	*Balaenoptera physalus*	-	x			*Special concern*												2	1																					
Sei whale	*Balaenoptera borealis*	-	x															2	1																					
Minke whale	*Balaenoptera acutorostrata*	-	x			*Not at risk*												1	2																					
Risso's dolphin	*Grampus griseus*	-	x															2	1																					
Long-finned pilot whale	*Globicephala melas*	-	x															1	2																					

Table 3-1.Vertebrate Species Present in Newfoundland.

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Killer whale	*Orcinus orca*	-	x			*Special concern*												1	2																											
Short-beaked common dolphi	*Delphinus delphinus*	-	x															1	2																											
Atlantic white-sided dolphin	*Lagenorhynchus acutus*	-	x			*Not at risk*												1	2																											
White-beaked dolphin	*Lagenorhynchus albirostris*	-	x															1	2																											
Harbor porpoise	*Phocoena phocoena*	-	x			*Special concern*												1																											
Northern bottlenose whale	*Hyperoodon ampullatus*	-	x															1	2																											
Sowerby's beaked whale	*Mesoplodon bidens*	-	x															1	2																											
Freshwater Fish																																															
Sea lamprey	*Petromyzon marinus*	*U*	x														2	1																											
Atlantic sturgeon	*Acipenser oxyrhynchus*	-	x															1																											
Alewife	*Alosa pseudoharengus*	*U*	x													3	2	1																											
American shad	*Alosa sapidissima*	*U*	x														2	1																											
Rainbow trout	*Onchorhynchus mykiss*	-	x													2	1	3																											
Atlantic salmon	*Salmo salar*	*U*	x													2		1																											
Brown trout	*Salmo trutta*	*L*	x													1	2																											
Arctic char	*Salvelinus alpinus*	-	x													2		1																											
Brook trout	*Salvelinus fontinalis*	*L*	x													1	2																											
Rainbow smelt	*Osmerus mordax*	*U*	x													1																											
American eel	*Anguilla rostrata*	*L*	x													1	2	3																											
Banded killifish	*Fundulus diaphanus*	-	x													1	2																											
Mummichog	*Fundulus heteroclitus*	-	x													2				1																									
Atlantic tomcod	*Microgadus tomcod*	*U*	x													3		2		1																									
Fourspine stickleback	*Apeltes quadracus*	*U*	x															1		2																									
Threespine stickleback	*Gasterosteus aculeatus*	*L*	x													1	2			3	4																							
Blackspotted stickleback	*Gasterosteus wheatlandi*	-	x																	1																									
Ninespine stickelback	*Pungitius pungitius*	*L*	x													1	2																											

Note: Species presence, habitat and breeding requirements, conservation status, and residence information was aquired from the following references:
Alsop, 2004; COSEWIC, 2009; Government of Newfoundland and Labrador, 2009; Kays and Wilson, 2002; Salmonier Nature Park, 2009; Scott and Crossman , 1979.

SNC·LAVALIN
Environment

DRAWINGS

- 723111-001 – Conceptual Site Model

RESIDENTIAL / RECREATIONAL LANDUSE

PONDS

PREDATORY BIRDS

COTTAGE

TREES

PISCIVOROUS BIRDS

PREDATORY BIRDS

SHORE BIRDS & WATERFOWL

MAMMALS

SONG BIRDS

SURFACE WATER

GRASS & SHRUBS

SOIL INVERTEBRATES

PREDATORY MAMMALS

OFFSITE MIGRATION

SEDIMENT

PISCIVOROUS MAMMALS

CONTAMINATED SOIL

PISCIVOROUS FISH

GROUNDWATER

AQUATIC PLANTS

FORAGE FISH

AQUATIC INVERTEBRATES

LEGEND

CONTAMINANT TRANSPORT

DIRECT CONTACT

INGESTION

REVISIONS				
REV.	DATE	DESCRIPTION	BY	CHK

CLIENT NAME
DEPARTMENT OF ENVIRONMENT CANADA

PROJECT LOCATION:
FORMER SALMONIER CORRECTIONAL FACILITY,
SALMONIER, NEWFOUNDLAND

SNC·LAVALIN Environment

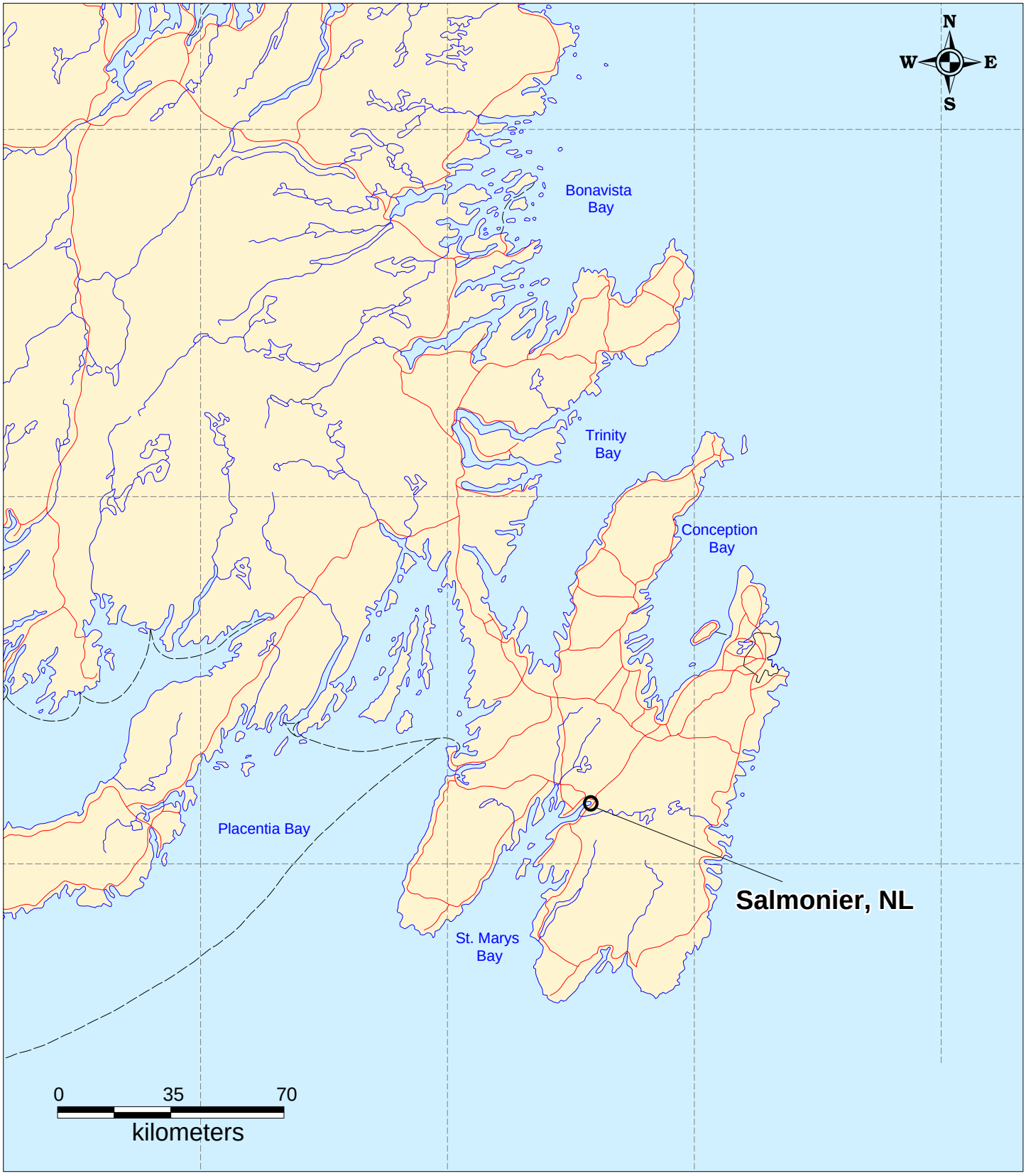
TITLE:

CONCEPTUAL SITE MODEL

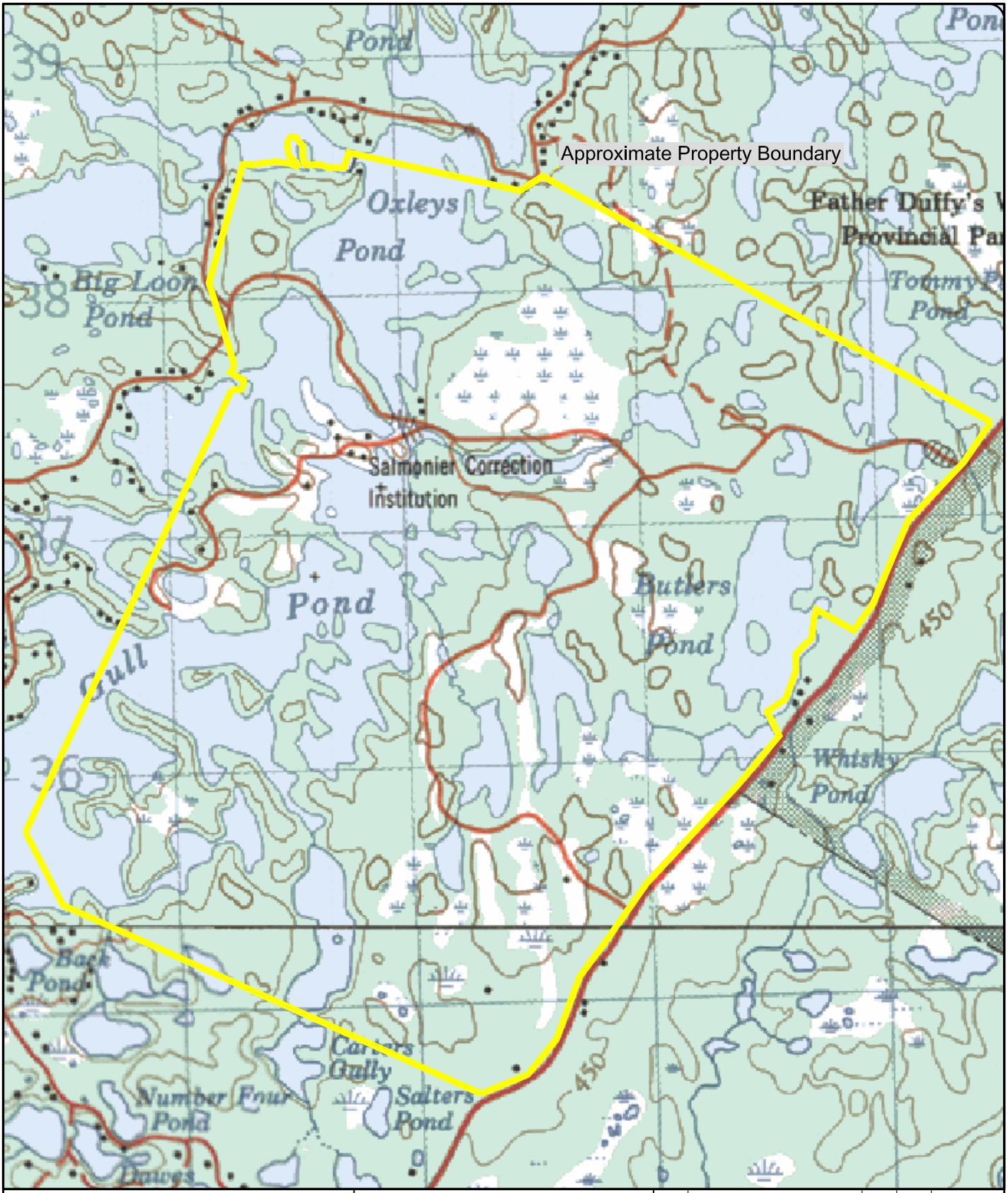
DWN BY: ALL	DATE: 2009 10 30	DWG No. 723111-001 REV: 1
CHK'D: GR	FILE: 723111 MODEL.CDR	

SNC·LAVALIN Environment

FIGURES



CLIENT DOEC		SNC·LAVALIN	DESIGNED AH	DATE 13/11/09	CHECKED JG	DATE 13/11/09
PROJECT PSAP - Former Salmonier Correctional Facility Site		1133 Topsail Road Mount Pearl, NL A1N 5G2	DRAWN AH	DATE 13/11/09	APPROVED RH	DATE 13/11/09
DRAWING TITLE Figure 1. Salmonier, Newfoundland		Tel: (709) 368-0118 Fax: (709) 368-5410	SCALE AS SHOWN		PROJECT NO. 723111	
			FILENAME 723111 - salmonierNL-Fig1.WOR			



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PROJECT: PSAP – FORMER SALMONIER CORRECTIONAL FACILITY SITE

DRAWING TITLE: FIGURE 2 – SALMONIER SUBJECT PROPERTY

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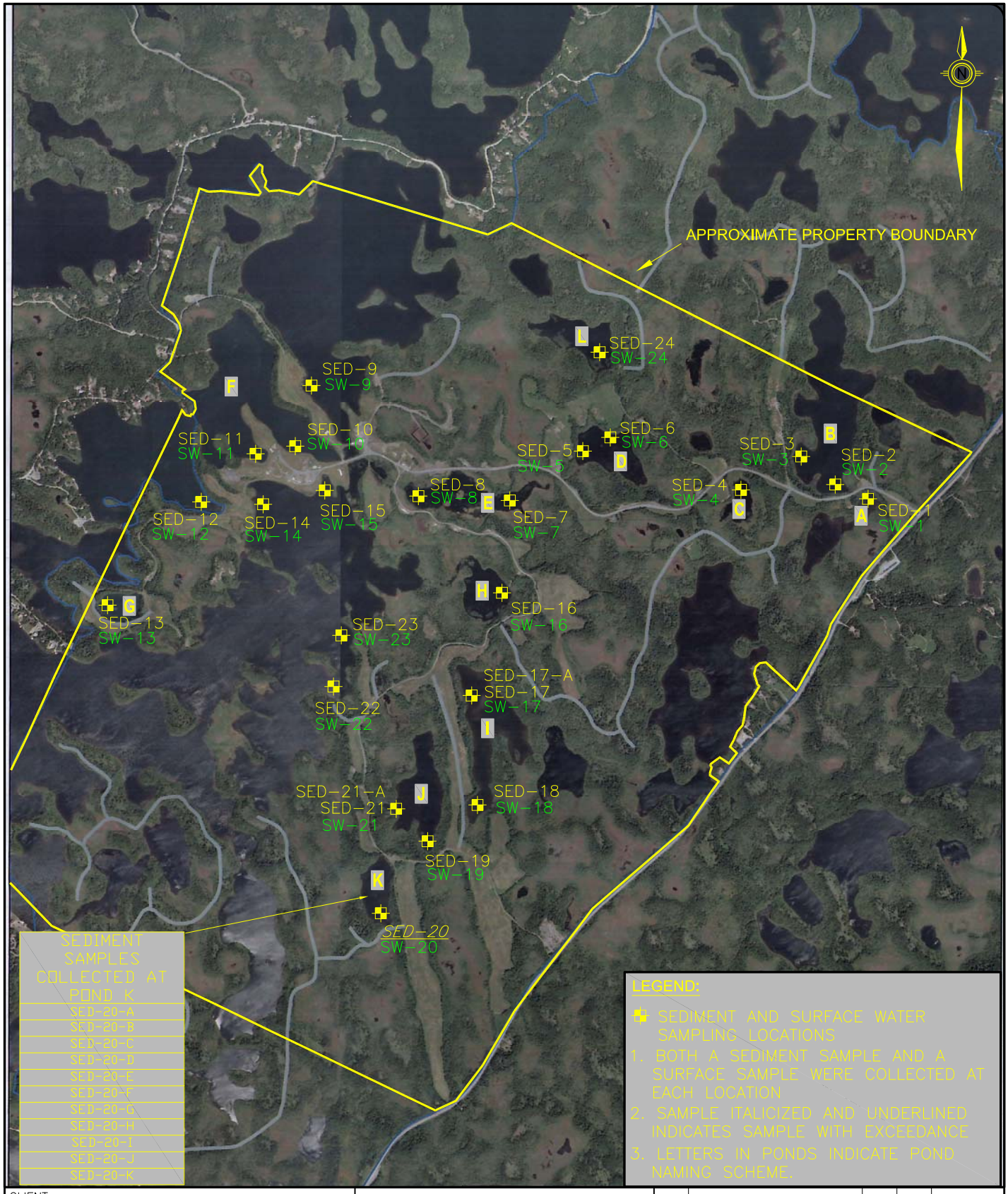

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DRAWING TITLE: FIGURE 3: SEDIMENT/SURFACE WATER LOCATIONS

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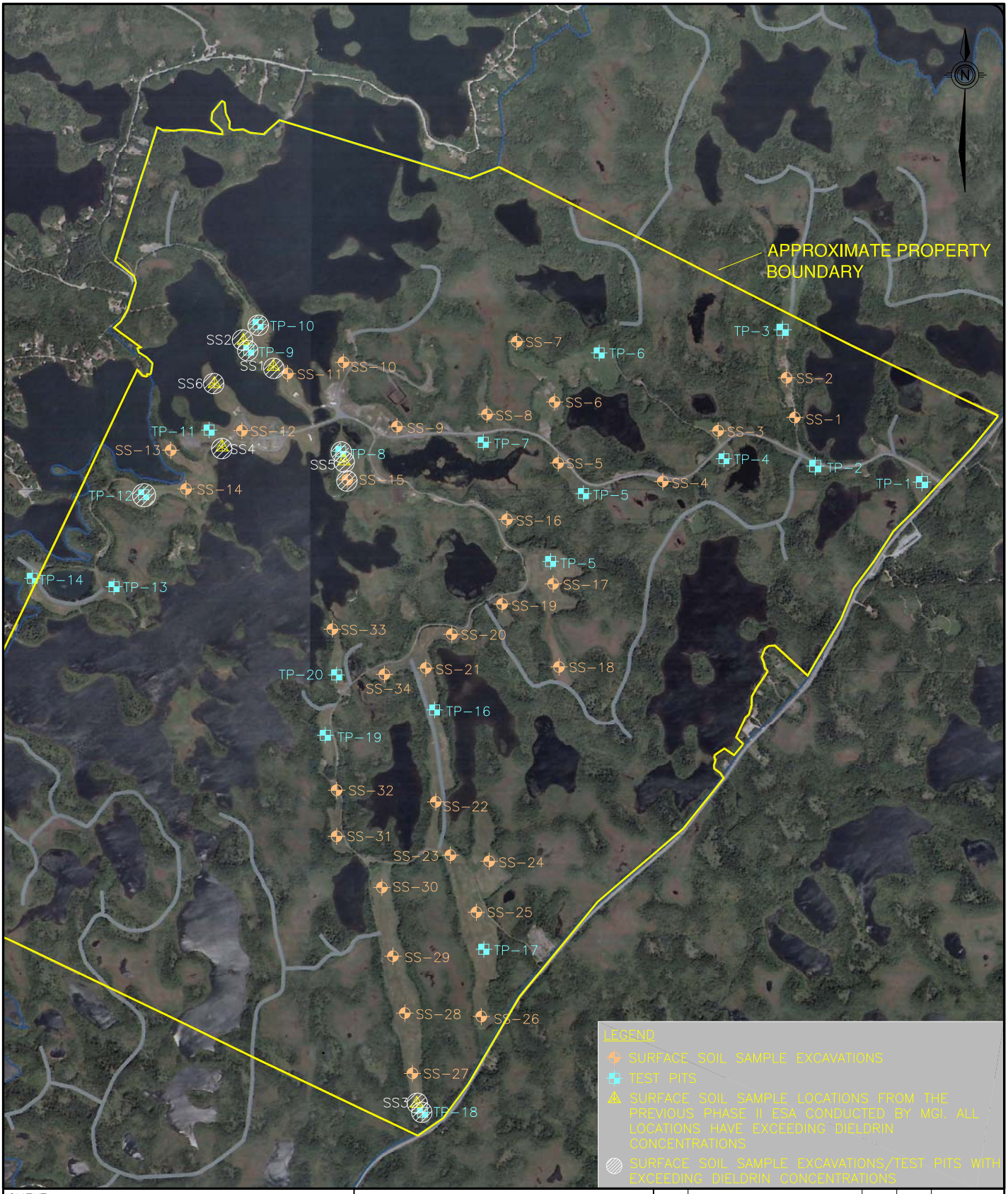
REFERENCE FILES:



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DRAWING TITLE: FIGURE 4: SOIL SAMPLE LOCATIONS

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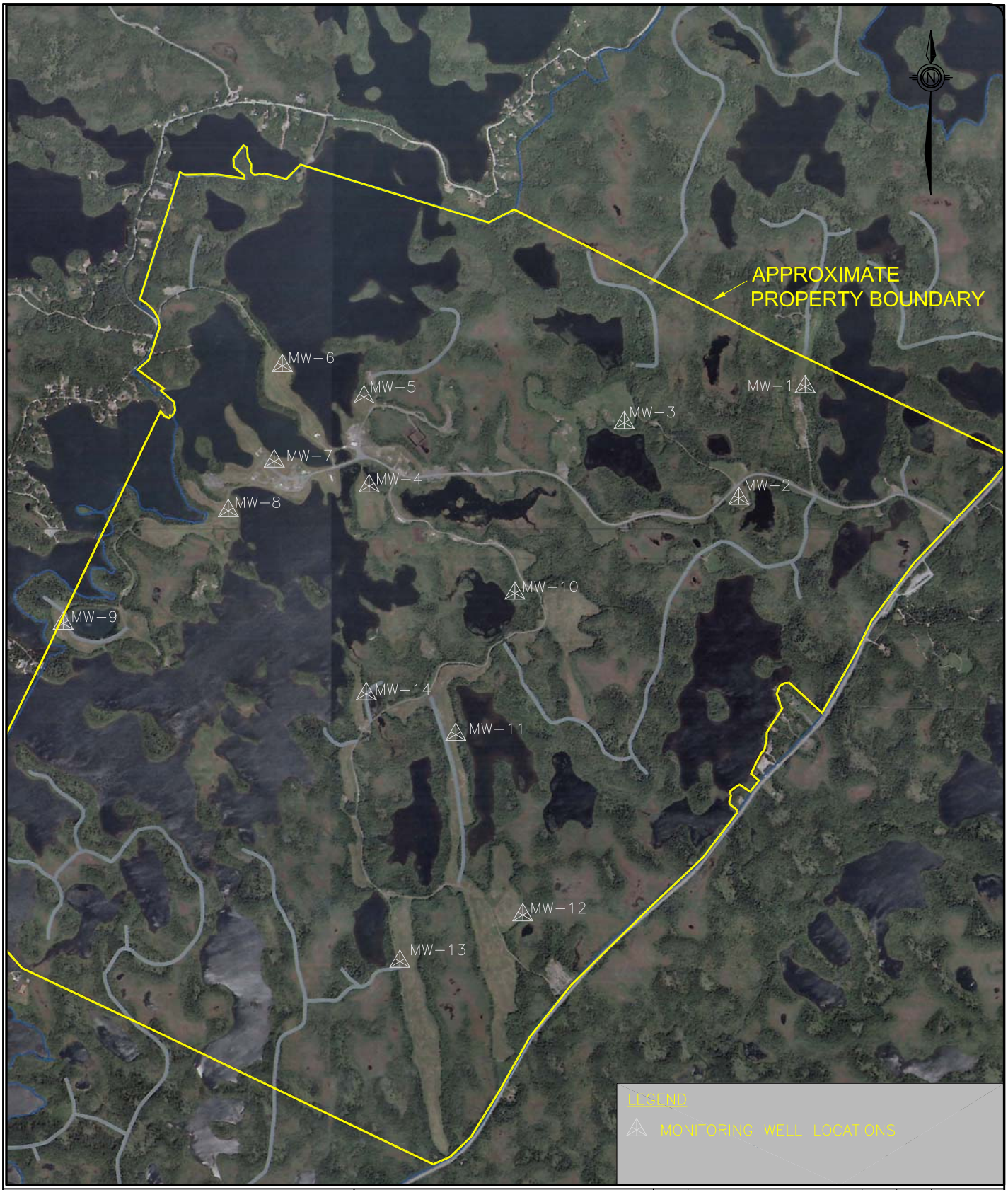

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DRAWING TITLE: FIGURE 5: MONITORING WELL/ GROUNDWATER SAMPLING LOCATIONS

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