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REVISED
REPORT ON

FISH POPULATION SURVEY AND FISH HABITAT ASSESSMENT OF KETCHIKAN LAKE, JUNIOR LAKE PROPERTY THUNDER BAY, ONTARIO

Submitted to:

Landore Resources Canada Inc.
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January 15, 2008 07-1192-0070R

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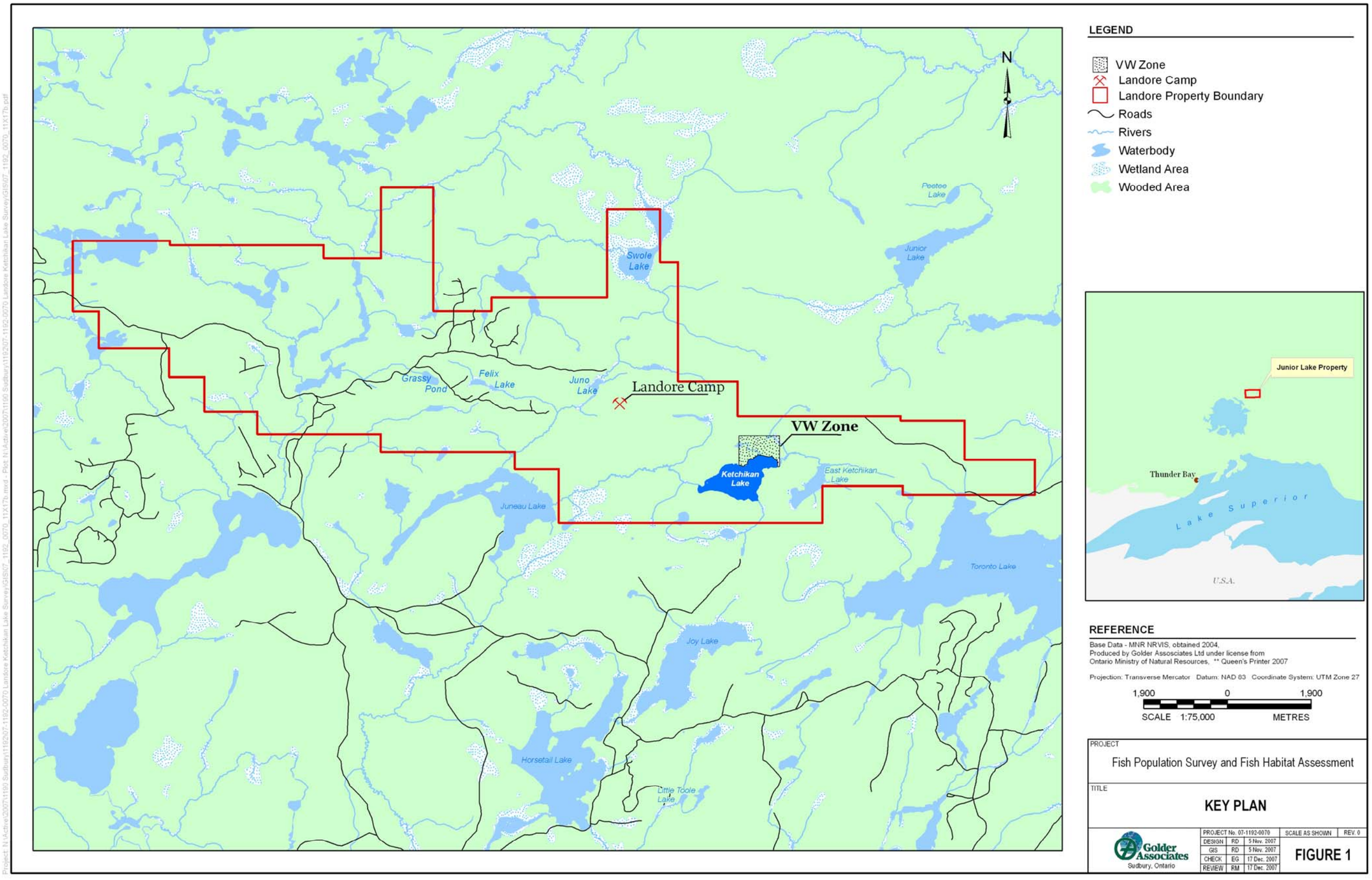
1.0 INTRODUCTION

In August 2007, Golder Associates Ltd. (Golder) completed a fish community survey and fish habitat assessment of Ketchikan Lake on behalf of Landore Resources Canada Inc. (Landore). Ketchikan Lake is located within the project boundaries of Landore's Junior Lake Property, located approximately 105 km east of the Town of Armstrong, Ontario (Figure 1).

The work performed was based on a written proposal (P7-1192-0070) prepared by Golder for Landore. The intended purpose of the work was to characterize the existing fish community and the near shore habitat in order to provide Landore with baseline information related to Ketchikan Lake and potential mining activity associated with the Junior Lake Property's "VW-Zone" which is in the exploration and pre-feasibility stage.


N
Peetee Lake
Junior Lake
Swole Lake
Grassy Pond
Felix Lake
Juno Lake
Landore Camp
VW Zone
Ketchikan Lake
East Ketchikan Lake
Juneau Lake
Toronto Lake
Joy Lake
Horsetail Lake
Little Toole Lake
LEGEND
VW Zone
Landore Camp
Landore Property Boundary
Roads
Rivers
Waterbody
Wetland Area
Wooded Area
Junior Lake Property
Thunder Bay
Lake Superior
U.S.A.
REFERENCE
Base Data - MNR NRVIS, obtained 2004.
Produced by Golder Assosciates Ltd under license from
Ontario Ministry of Natural Resources, ** Queen's Printer 2007
Projection: Transverse Mercator Datum: NAD 83 Coordinate System: UTM Zone 27
1,900 0 1,900
SCALE 1:75,000 METRES
PROJECT
Fish Population Survey and Fish Habitat Assessment
TITLE
KEY PLAN
Golder Associates
Sudbury, Ontario
PROJECT No. 07-1192-0070 SCALE AS SHOWN REV. 0
DESIGN RD 5 Nov. 2007
GIS RD 5 Nov. 2007
CHECK EG 17 Dec. 2007
REVIEW RM 17 Dec. 2007
FIGURE 1

2.0 SCOPE OF WORK

The scope of work for this project was planned in two parts. The first part (Phase I) consisted of completing a desktop review that included the following tasks:

- Contacting the relevant individuals at Landore, the Department of Fisheries and Oceans (DFO) and Ontario Ministry of Natural Resources (MNR) to obtain any existing fish population information on Ketchikan Lake; and
- Reviewing the collected information to determine its suitability for this study.

The second part (Phase II) consisted of the completion of a summer field program on Ketchikan Lake. The field work supplemented the limited amount of fish population data found during the desktop review and to identified existing and potential fish habitat within Ketchikan Lake.

The fish community assessment consisted of the following tasks:

- Identifying fish species present;
- Identifying the physical location of fish within the lake; and
- Collecting meristic data (i.e. length, weight, state of maturity, external health) for the species observed.

The fish habitat work consisted of the following tasks:

- Mapping the shoreline of the lake to determine the types of habitat available for fish within near shore areas (0-2 m);
- Delineating any shoal/island habitat areas to determine the types of habitat available for fish within these locations; and
- Collecting bathymetry data to characterize deeper areas of the lake (>2.0 m).

3.0 PHASE I – DESKTOP REVIEW

Golder personnel researched available information related to fish and fish habitat during the summer of 2007. No information or records pertaining to the type and abundance of fish species found in Ketchikan Lake were found based on enquiries made by Golder to Landore, the MNR (Ray Tyhuis, personal communication 2007), and the DFO Thunder Bay office. According to the MNR, local First Nation Communities (the Lake Nipigon Ojibwas and the Biinjitiwaabik Zaaging Anishinaabek First Nation) do not currently utilize Ketchikan Lake for commercial or traditional fisheries purposes.

4.0 PHASE II – FISH COMMUNITY SURVEY AND FISH HABITAT ASSESSMENT

4.1 Fish Community Survey

The determination of fish population characteristics is a valuable component of any lake assessment study. Information such as species presence and abundance, along with general health provide useful information on the community structure of resident fish populations.

4.1.1 Methods

Prior to conducting the field survey, a Scientific Collector's Permit (Licence No. Nipigon-007-010) was issued by the MNR to Golder. Field work was completed during the week of August 13, 2007.

Fish inventory methods, as outlined in Golder's Technical Procedures (Golder 1997), were utilized during the community survey. Bottom set gill nets and minnow traps were employed to collect fish. Recorded set times for gill nets varied between five to eight hours during daylight hours, while each minnow trap was set for approximately twenty-four hours. Gill net and minnow trap sets were located throughout the lake at a variety of depths and in a range of habitat types.

All captured fish were placed in a water filled container and released back into Ketchikan Lake once processed. For each fish, species, fork length (to nearest 1 mm), total body weight (to nearest 0.1 g) and external condition were recorded. Observations of any external features that did not appear normal (i.e. wounds, tumours, parasites, fin fraying, gill parasites or lesions) were noted.

An aging structure was collected from the limited number of fish (one northern pike [*Esox lucius*] and four walleye [*Sander vitreus*]) that died as a result of capture (scales and the second dorsal spine from walleye and scales or cleithra from the northern pike). Aging structures and tissue samples were placed into labelled envelopes and bags and provided to the Nipigon area MNR office for archiving.

Supporting field measurements that included water quality readings (temperature, dissolved oxygen, pH and conductivity), weather observations (wind speed and direction) and Global Positioning System (GPS) coordinates of capture gear were included on each gill net and minnow trap catch record.

4.1.2 Results and Discussion

Catch Summary

A summary of the sample gear used, the GPS locations (NAD 83) where it was used and information related to gill net length and gill net/minnow trap mesh size is provided in Table 1.

A total of 66 fish were captured consisting of four species; northern pike, walleye, lake herring (*Coregonus artedii*) and yellow perch (*Perca flavescens*). Fish were captured in all nine gill net sets and in one minnow trap. Completed field catch records are included in Appendix A, while the catch summary and species composition data for Ketchikan Lake is presented in Table 2.

Catch-per-Unit-Effort (CPUE)

Differences in sample gear types, set locations, catchability of different species and spatial variance in species abundance can all bias sampling effort. In an attempt to standardize sampling effort resulting from these biases, CPUE calculations for the use of gill nets and minnow traps (passive sampling gear) were used to provide an approximate index of relative abundance of a fish species. CPUE results for all fish species captured by each sample method are presented in Table 3.

Gill net sets indicate that lake herring had the highest relative abundance followed by walleye and northern pike. Minnow trap sets resulted in the capture of yellow perch only.

Population Characteristics

A summary of the biometric data collected (i.e. fork length and weight) is presented as follows in Table 4. The two yellow perch captured in the minnow trap were not measured.

Based on the limited number of fish collected, the biometric data in terms of lengths and weights within species suggests that both juvenile and mature individuals representing each fish species were captured during the survey. Overall, the external health of all fish captured was noted to be good (absence of lesions, visible parasites, good overall body and fin condition).

TABLE 1
SAMPLE GEAR SUMMARY FOR KETCHIKAN LAKE AUGUST 2007

GEAR TYPE	ID	Easting	Northing	Set	Lifted	Length (m)	Mesh Size (mm)
Experimental gill net	GN1	435544	5579906	15/08/2007 10:48	15/08/2007 19:23	122	12.7, 50.8, 63.5, 76.2, 88.9, 101.6, 114.3, 127
Experimental gill net	GN2	434941	5580154	15/08/2007 11:20	15/08/2007 19:05	122	12.7, 50.8, 63.5, 76.2, 88.9, 101.6, 114.3, 127
Experimental gill net	GN3	435838	5580506	15/08/2007 11:58	15/08/2007 19:38	122	12.7, 50.8, 63.5, 76.2, 88.9, 101.6, 114.3, 127
Experimental gill net	GN4	435949	5580185	16/08/2007 8:05	16/08/2007 15:20	122	12.7, 50.8, 63.5, 76.2, 88.9, 101.6, 114.3, 127
Experimental gill net	GN5	435826	5580360	16/08/2007 8:28	16/08/2007 16:10	122	12.7, 50.8, 63.5, 76.2, 88.9, 101.6, 114.3, 127
Experimental gill net	GN6	436149	5580633	16/08/2007 8:40	16/08/2007 16:40	122	12.7, 50.8, 63.5, 76.2, 88.9, 101.6, 114.3, 127
Experimental gill net	GN7	435799	5580440	17/08/2007 8:35	17/08/2007 13:54	122	12.7, 50.8, 63.5, 76.2, 88.9, 101.6, 114.3, 127
Experimental gill net	GN8	435051	5580304	17/08/2007 8:00	17/08/2007 13:38	122	12.7, 50.8, 63.5, 76.2, 88.9, 101.6, 114.3, 127
Experimental gill net	GN9	434998	5580046	17/08/2007 8:15	17/08/2007 13:16	122	12.7, 50.8, 63.5, 76.2, 88.9, 101.6, 114.3, 127
Minnow trap	MT1	435767	5579720	15/08/2007 10:09	17/08/2007 9:02	-	Trap opening 30 mm, mesh size 5 mm
Minnow trap	MT2	436384	5580470	15/08/2007 9:51	17/08/2007 8:54	-	Trap opening 30 mm, mesh size 5 mm
Minnow trap	MT3	435721	5580615	15/08/2007 9:30	17/08/2007 8:45	-	Trap opening 30 mm, mesh size 5 mm

TABLE 2
CATCH SUMMARY AND SPECIES COMPOSITION FOR KETCHIKAN LAKE
AUGUST 2007

Method	No. of Sets	Total Time Set (hrs)	Species				
			Walleye	Northern Pike	Lake herring	Yellow perch	Total Fish
Gill net	9	63.3	21	9	34	0	64
Minnow trap	3	141.8	0	0	0	2	2

TABLE 3
RELATIVE ABUNDANCE (CPUE) OF FISH SPECIES FOR KETCHIKAN LAKE
AUGUST 2007

Method	No. of Sets	Total Time Set (hrs)	Species				
			Walleye	Northern Pike	Lake herring	Yellow perch	Total CPUE
Gill net	9	63.3	0.03	0.01	0.05	0.00	0.10
Minnow trap	3	141.8	0.00	0.00	0.00	0.01	0.01

Note: CPUE = number of fish/hour/length of net set **or** number of fish/hour/trap

TABLE 4
POPULATION CHARACTERISTICS SUMMARY OF FISH SPECIES
FOR KETCHIKAN LAKE
AUGUST 2007

Species	No. Captured	Measurement	Min	Max	Mean	Standard Deviation
Northern pike		Fork length (mm)	417	757	558	120
	9	Total length (mm)	443	805	586	140
		Weight (g)	490	2700	1215	837
Lake herring		Fork length (mm)	157	265	208	89
	34	Total length (mm)	175	298	232	30
		Weight (g)	30	220	108	50
Walleye		Fork length (mm)	251	645	410	132
	21	Total length (mm)	270	687	436	140
		Weight (g)	140	2725	890	795

4.2 Fish Habitat Assessment

The fish habitat assessment of Ketchikan Lake was conducted concurrently with the fish population survey during the week of August 13, 2007.

4.2.1 Methods

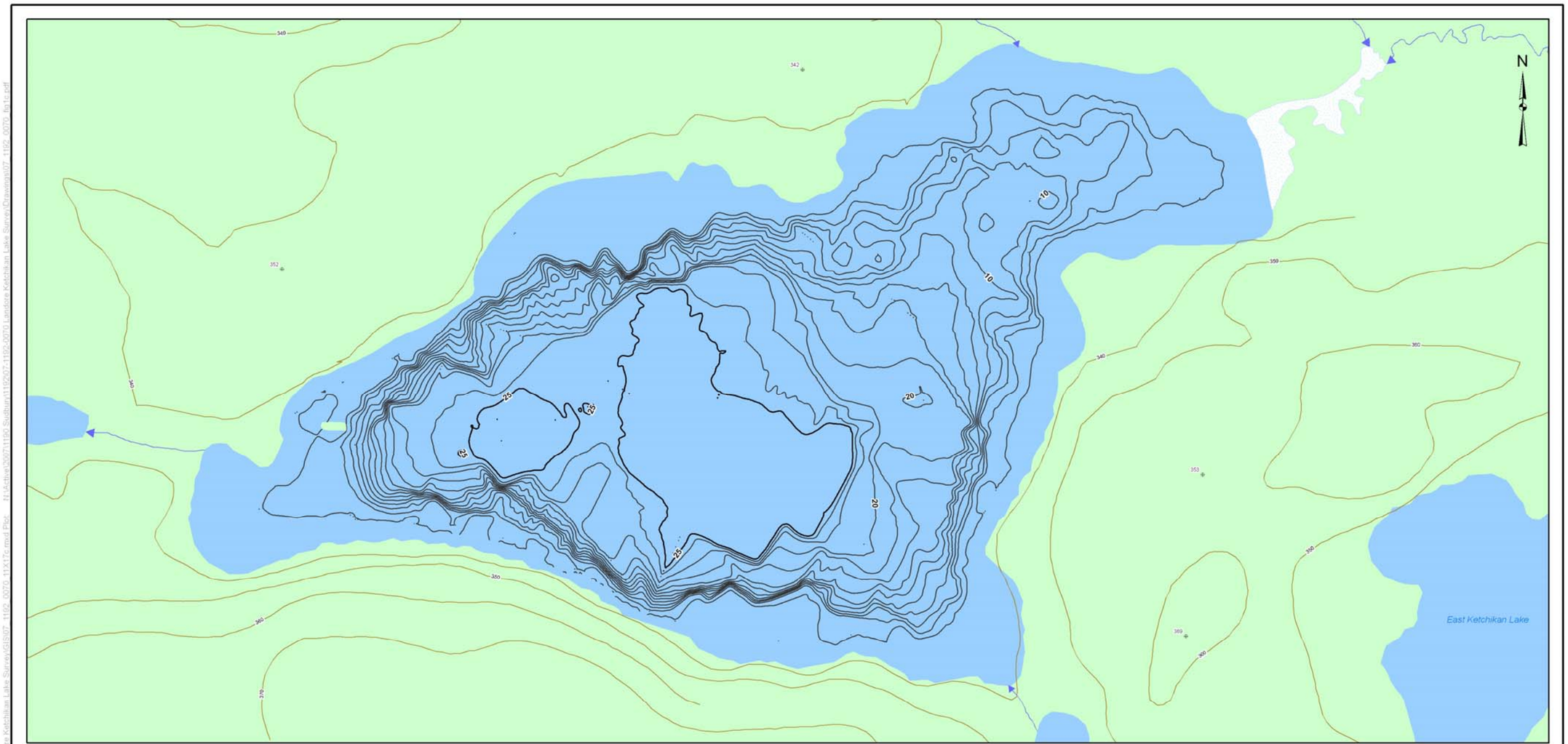
The habitat assessment consisted of cruising the entire shoreline of the lake by boat, including islands and shoals and constructing a habitat map based upon visual observations. Methods employed to generate the habitat map were consistent with the criteria as outlined in Golder's Technical Procedures for Lake Habitat Mapping (Golder 1997).

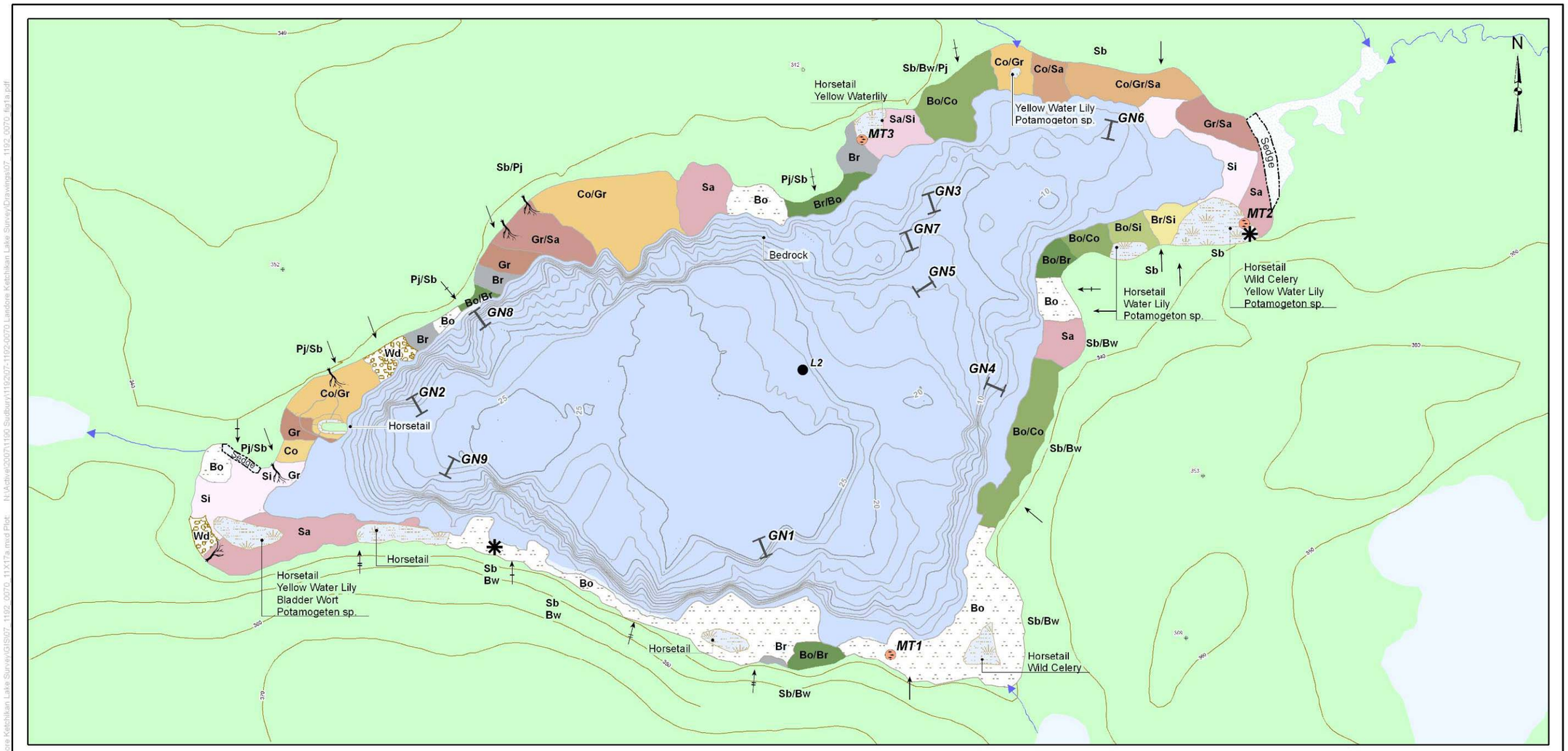
Habitat information included features both above and below the waterline. Above the waterline, this included such features as: shoreline slope, shoreline vegetation and location of stream inlets/outlets. Shoreline features noted below the water line included: substrate type and the presence of shoals, floating or submerged vegetation and logs.

For the purpose of this habitat assessment and due to the clarity of the water (stained or "tea' coloured due to presence of tannins in the water), habitat at depths greater than 2 m could not be readily assessed.

Deeper portions of the lake were mapped using a GPS bathymetry unit to give an approximation of the lake's bathymetry in areas that could not be visually habitat mapped.

From the completed field work, a lake bathymetry map (Figure 2) and a coded habitat map (Figure 3) identifying the various types of fish habitat available in Ketchikan Lake (within the littoral zone) were prepared.


N
East Ketchikan Lake
LEGEND
Spot Height (m)
Contour Lines (m)
Bathymetry Depth (2 metre intervals)
Water Flow Direction
Waterbody
Wetland Area
Wooded Areas
0 50 100
Meters
1 : 6 500
REFERENCE
Base Data - MNR NRVIS, obtained 2004,
Produced by Golder Assosciates Ltd under license from
Ontario Ministry of Natural Resources, *** Queen's Printer 2007
Projection: Transverse Mercator Datum: NAD 83 Coordinate System: UTM Zone 17
PROJECT
Fish Population Survey and Fish Habitat Assessment
TITLE
KETCHIKAN LAKE BATHYMETRY
Golder Associates
Sudbury, Ontario
PROJECT No. 07-1192-0070 SCALE AS SHOWN REV. 0
DESIGN RM Oct. 16, 2007
GIS RD Oct. 16, 2007
CHECK EG Dec. 16, 2007
REVIEW RM Dec. 16, 2007
FIGURE 2



LEGEND

- Gill Net
- Minnow Trap
- Water Sampling Location
- Water Flow Direction
- Waterbody
- Wetland Area
- Wooded Areas
- Contour Lines (m)
- *Depth (2 metre intervals)*
- Spot Height (m)
- Sedge
- Vegetated Area
- Bo - Boulder
- Wd - Woody Debris
- Bo/Br - Boulder / Bedrock mix
- Bo/Co - Boulder / Cobble mix
- Bo/Si - Boulder / Silt mix
- Br - Bedrock
- Br/Si - Bedrock / Silt
- Co - Cobble
- Co/Gr - Cobble / Gravel mix
- Co/Gr/Sa - Cobble / Gravel / Sand mix
- Co/Sa - Cobble / Sand mix
- Gr - Gravel
- Gr/Sa - Gravel / Sand mix
- Sa - Sand
- Sa/Si - Sand / Silt mix
- Si - Silt
- Tree / Dead Fall
- Beaver House

Slope
- Shallow
- Intermediate
- Steep

Bw - White Birch
Pj - Jack Pine
Sb - Black Spruce
Wd - Woody Debris

REFERENCE

Base Data - MNR NRVIS, obtained 2004,
Produced by Golder Associates Ltd under license from
Ontario Ministry of Natural Resources, *** Queen's Printer 2007

Projection: Transverse Mercator Datum: NAD 83 Coordinate System: UTM Zone 17

0 50 100
Meters
1 : 6 500

PROJECT
Fish Population Survey and Fish Habitat Assessment

TITLE
KETCHIKAN LAKE
FISH HABITAT AND SAMPLING LOCATIONS

Golder Associates
Sudbury, Ontario

PROJECT No. 07-1192-0070			SCALE AS SHOWN	REV. 0
DESIGN	RD	Oct. 16, 2007	**FIGURE 3**	
GIS	RD	Oct. 16, 2007		
CHECK	EG	Dec. 16, 2007		
REVIEW	RM	Dec. 17, 2007		

Project: N:\Active\2007\1190 Sudbury\11-92\07-1192-0070 Landore Ketchikan Lake Survey\GIS\07_1192_0070_11X17a.mxd Plot: N:\Active\2007\1190 Sudbury\11-92\07-1192-0070 Landore Ketchikan Lake Survey\Drawings\07_1192_0070_fig1a.pdf

Measures of surface water quality (i.e. water temperature, pH and conductivity) associated with the fishing effort were recorded during each day of the field program on standardized catch record forms. In addition, as part of a baseline water quality monitoring program being undertaken by Landore, water quality samples were collected from one station (L2) on Ketchikan Lake at the surface, mid-column and 1 m off bottom. Samples were collected into pre-labelled bottles using a two litre Van Doren style discrete water sampler, kept in an insulated cooler and submitted to Testmark Laboratories Ltd. of Garson, Ontario, for the following analysis: total dissolved solids, total suspended solids, total phosphorus, total organic carbon (TOC), dissolved organic carbon, ammonium, alkalinity, hardness, sulphate, nitrate, nitrite, chloride, fluoride, an ICP MS dissolved metals scan and an ICP MS total metals scan.

4.2.2 Results and Discussion

General Habitat Summary

Ketchikan Lake is approximately 97.2 ha in size with approximately 5.5 km of shoreline. Lake morphology is dominated by open water with one small island located along the western shore of the lake. The main fetch (length of wind exposed water with no obstacles) is oriented in a northeast to southwest direction. Bathymetric mapping (Figure 2) indicates that the lake is comprised of a central basin of at least 25 m depth that is steeply sloped along the north and south sides of the lake. A smaller basin of approximately 10 m deep is located within the northeast portion of the lake. Mean lake depth is 13.5 m. Waters within Ketchikan Lake were fairly turbid.

The lake has three permanent inflows (Photos 1, 2 and 3 and Figure 3) located on the north, northeast and south shores of the lake. Of these inlets, the one located on the northeast shore (Photo 2) is the largest and is associated with an extensive area of wetland. The inlet on the north shore is slow-flowing and accessible to fish (Photo 1). The third inlet, located on the south shore (Photo 3) is faster-flowing and impassible to fish. There is one outlet located on the west shore of the lake (Photo 4 and Figure 3) that connects Ketchikan Lake to Juneau Lake. It is unknown whether this connection is passable to fish.

The shoreline surrounding Ketchikan Lake consists of shallow to intermediately sloped land dominated by a forested community consisting of a mixture of black spruce (*Picaea nigra*), jack pine (*Pinus banksiana)* and white birch (*Betula paplyfolia*). Shoreline vegetation within the riparian zone typically extends to the water's edge (Photo 5) with varying amounts of woody debris and deadfall extending into the lake (Photos 6 and 7).

The shoreline and adjacent littoral zone includes areas dominated by bedrock (Photo 8), boulder (Photo 9) and emergent/submergent macrophytic vegetation (Photos 10 and 11). Aquatic species observed included yellow water lily (*Nuphar variegatum*), bladderwort (*Utricularia vulgaris*),

horsetail *(Equisetum telmateia)*, floating pondweed *(Potamegeton sp.*), wild celery (*Vallisneria americana*) and sedges (*Cyperaceae sp*.) Specific areas where aquatic cover was more concentrated are indicated on Figure 3.

Within the observable littoral zone of Ketchikan Lake, boulder (Bo) was the predominate substrate type observed (27%), followed by cobble/gravel (Co/Gr) at 14%, sand (Sa) at 12%, boulder/cobble (Bo/Co) at 11%, silt (Si) at 8% and gravel/sand (Gr/Sa) at 6%. Various substrate combinations (i.e. boulder/bedrock (Bo/Br), sand/silt (Sa/Si), cobble/sand (Co/Sa)) comprised the remainder (22%) of the areas visually assessed (Figure 3).

Photo 1
Inlet on north shore
Ketchikan Lake, August 2007

Photo 2
Inlet on northeast shore
Ketchikan Lake, August 2007

Photo 3
Inlet on south shore
Ketchikan Lake, August 2007

Photo 4
Outlet on west shore, looking towards lake
Ketchikan Lake, August 2007

Photo 5
Typical shoreline habitat
Ketchikan Lake, August 2007

Photo 6
Typical shoreline with woody debris
Ketchikan Lake, August 2007

Photo 7
Typical example of woody debris and deadfall along shore
Ketchikan Lake, August 2007

Photo 8
Bedrock dominated area along north shoreline
Ketchikan Lake, August 2007

Photo 9
Boulder dominated area along north shoreline
Ketchikan Lake, August 2007

Photo 10
Sedge dominated area along west shore
Ketchikan Lake, August 2007

Photo 11
Submergent macrophyte area along eastern shore
Ketchikan Lake, August 2007

Water Quality

Observed daily surface water quality parameters were recorded on all gillnet/minnow trap catch records (Appendix A) and are summarized in Table 5 below. Daily water chemistry parameters for dissolved oxygen and pH were within acceptable ranges for the applicable Provincial Water Quality Objectives (PWQO 1994). Surface water temperatures and conductivity reflected a seasonal range of anticipated values. Water clarity within Ketchikan Lake, as previously described, is "tea stained", likely as a result of tannin inputs from the surrounding forested lands.

The water quality sample (surface, mid-depth and bottom) results collected from Station L2 (station depth of approximately 16 m) had metal values that were below the applicable with the exception of one sample for cobalt, (0.14 vs. 0.9ug/L) taken from near the lake bottom. General chemistry parameters were indicative of values associated with other typical Precambrian Shield lakes (Gunn et. Al. 2004).

The sample results are presented in Table 6 below, with the laboratory analytical certificates included in Appendix B.

TABLE 5
DAILY WATER CHEMISTRY PARAMETERS FOR KETCHIKAN LAKE
AUGUST 2007

Date	Water Temperature (°C)	Dissolved Oxygen (mg/L)	Conductivity (µS/m)	pH
15-Aug-07	14.9	12.0	87.0	6.33
16-Aug-07	19.3	9.3	88.0	6.96
17-Aug-07	17.5	8.0	88.0	6.50

TABLE 6
WATER QUALITY MONITORING RESULTS FOR SURFACE, MID-DEPTH AND BOTTOM SAMPLES FOR KETCHIKAN LAKE
AUGUST 2007

Parameter	Units	MDL	PWQO	Station L2		
				Surface	Mid -Depth	Bottom
Metals						
Aluminum	ug/L	1	(15 - 75)[a]	30.2	27.8	28.6
Antimony	ug/L	0.5	(20)	<0.5	<0.5	<0.5
Arsenic	ug/L	1	100 (5)	<1	<1	<1
Barium	ug/L	1	-	5.4	5	4.9
Berylium	ug/L	0.5	-	<0.5	<0.5	<0.5
Bismuth	ug/L	1	-	<1	<1	<1
Boron	ug/L	2	(200)	6.1	6.3	4.7
Cadmium	ug/L	0.1	(0.1 - 0.5)[b]	<0.1	<0.1	<0.1
Calcium	ug/L	50	-	14400	13600	13900
Cerium	ug/L	1	-	<1	<1	<1
Cesium	ug/L	1	-	<1	<1	<1
Chromium	ug/L	1	(1 - 8.9)[c]	<1	<1	<1
Cobalt	ug/L	0.1	0.9	<0.1	<0.1	0.14
Copper	ug/L	1	(1 - 5)[d]	<1	<1	<1
Europium	ug/L	1	-	<1	<1	<1
Gallium	ug/L	1	-	<1	<1	<1
Iron	ug/L	20	300	33	20	36
Lanthanum	ug/L	1	-	<1	<1	<1
Lead	ug/L	1	(1 - 5)[e]	<1	<1	<1
Lithium	ug/L	5	-	<5	<5	<5
Magnesium	ug/L	4	-	3940	3780	3590
Manganese	ug/L	1	-	3.2	2.8	2.7
Mercury	ug/L	0.1	-	<0.1	<0.1	<0.1
Dissolved Mercury	ug/L	0.1	0.2			
Molybdenum	ug/L	1	(40)	<1	<1	<1
Nickel	ug/L	1	25	1.5	1.4	1.2
Niobium	ug/L	1	-	<1	<1	<1
Rubidium	ug/L	1	-	1.3	1.2	1.3
Scandium	ug/L	1	-	<1	<1	1.7
Selenium	ug/L	1	100	<1	<1	<1
Silver	ug/L	0.1	0.1	<0.1	<0.1	<0.1
Strontium	ug/L	1	-	15.6	15.1	14.3
Thallium	ug/L	0.1	(0.3)	<0.1	<0.1	<0.1
Thorium	ug/L	1	-	<1	<1	<1
Tin	ug/L	1	-	<1	<1	<1

TABLE 6 CONTINUED
WATER QUALITY MONITORING RESULTS FOR SURFACE, MID-DEPTH AND BOTTOM SAMPLES, KETCHIKAN LAKE
AUGUST 2007

Parameter	Units	MDL	PWQO	Station L2		
				Surface	Mid -Depth	Bottom
Titanium	ug/L	1	-	<1	<1	<1
Tungsten	ug/L	1	(30)	<1	<1	<1
Uranium	ug/L	1	(5)	<1	<1	<1
Vanadium	ug/L	1	(6)	<1	<1	<1
Yttrium	ug/L	1	-	<1	<1	<1
Zinc	ug/L	1	30 (20)	2.1	3.9	1.5
Zirconium	ug/L	1	(4)	<1	<1	1.4
General Chemistry						
Ammonia (as N)	mg/L	0.002	20	0.026	0.03	0.052
Calcium	mg/L	0.05	-	13.4	12.9	13.4
Chloride	mg/L	0.2	-	0.41	0.33	0.48
Fluoride	mg/L	0.1	-	<0.1	<0.1	<0.1
Magnesium	mg/L	0.004	-	3.65	3.55	3.09
Alkalinity	mg/L	10	-[f]	44	45	87
Nitrate (as N)	mg/L	0.1	-	<0.1	<0.1	<0.1
Nitrite (as N)	mg/L	0.03	-	<0.03	<0.03	<0.03
Sulfate	mg/L	1	-	2	1	1.1
Dissolved Organic Carbon	mg/L	0.4	-	13	12	7
Total Dissolved Solids	mg/L	25	-	68	76	83
Total Hardness (as CaCO3)	mg/L	0.1	-	48.6	46.9	46.2
Total Organic Carbon	mg/L	0.4	-	15	12	11
Total Phosphorus	ug/L	50	20	0.023	0.025	0.021
Total Suspended Solids	mg/L	6	-	<6	<6	<6

Notes:
Parameter values as total concentration unless otherwise indicated
MDL - Method Detection Limit
PWQO - Provincial Water Quality Objectives
( ) - Values in brackets are Interim PWQO values
a - At pH 4.5 to 5.5 the interim PWQO is 15 µg/L, at pH >5.5 to 6.5 no condition should be permitted which would increase the the inorganic aluminum concentration to more than 10% above background concentrations, at pH >6.5 to 9.5 the interim PWQO is 75 µg/L
b - At a hardness value of 0 to 100 mg/L (CaCO3) the interim PWQO for cadmium is 0.1 µg/L, at a hardness value of >100 the interim PWQO is 0.5 µg/L
c - PWQO for hexavalent chromium is 1.0 ug/L, PWQO for trivalent chromium is 8.9 µg/L
d - At a hardness value of 0 to 20 mg/L (CaCO3) the interim PWQO for copper is 1.0 µg/L, at a hardness value of >20 mg/L the interim PWQO for copper is 5 µg/L
e - At a hardness value of <30 mg/L the interim PWQO value for lead is 1.0 µg/L, at an alkalinity of 30 to 80 mg/L the interim PWQO is 3 µg/L, at an alkalinity value of >80 mg/L the interim PWQO is 5 µg/L
f - Alkalinity should not be decreased by more than 25% of the natural concentration

4.3 General Habitat Requirements

Generalized fish habitat preferences derived from literature that has been documented for the species captured during this assessment are presented in Table 7. Based on these typical habitat preferences inferences as to the suitability and potential use of the various habitat types found within Ketchikan Lake are outlined below.

TABLE 7
TYPICAL LAKE HABITAT PREFERENCES BY FISH SPECIES [1.]

Species	Northern pike				Lake herring (Cisco)				Walleye				Yellow perch			
	Ratings [3.]				Ratings [3.]				Ratings [3.]				Ratings [3.]			
Habitat Features	**Spawning /Egg**	**YOY [2.]**	**Juvenile**	**Adult**	**Spawning/ Egg**	**YOY [2.]**	**Juvenile**	**Adult**	**Spawning /Egg**	**YOY [2.]**	**Juvenile**	**Adult**	**Spawning /Egg**	**YOY [2.]**	**Juvenile**	**Adult**
Lake depth (m)																
0-1	high	high	high	high	med	high	high	high	med	high	high	high	high	high	high	high
1-2	med	med	high	high	high	high	high	high	high	high	high	high	high	high	high	high
2-5	low	low		high	high	high	high	high	high	high	high	high	high	high	high	high
5-10	low			med	med	high	high	high	high	high	high	high	high	high	high	high
10+	nil			low	med		high	high			high	high			low	low
Substrate																
bedrock					nil	nil			low			med				low
boulder					med	med			med		med	med				low
cobble					high	high	high	med	high		med	med			med	low
rubble			low	low	high	high	med	med	high		high	high	low		med	med
gravel				low	high	med	high		high	high	high	high	med	high	med	high
sand				high	high	low	high	med	med	high	high	high	med	high	med	high
silt-clay		high	high	high	med			med	low	high	med	high	low	high	med	high
muck			high	high					low	high		high		high	high	high
pelagic				high		med	high	high	low	med		low		high	high	high
Cover																
none	low	low	low	med		med	med	med	med		med	med			med	med
submergents	high	high	high	high		low			low	low	low	low	high	high	high	high
emergents	high	high	med	high				med	low	low	low	low	med	med	med	med
overhead											high	high	med			
in situ			med	high			med		high		med	high	med		med	

Notes: 1. Langhorne, A.L. et al 2001

2. Young of Year

3. Ratings are low, medium or high in terms of habitat preferences during specific life stages.

Northern pike

Northern pike were caught in experimental gill net sets GN2, GN3, GN6 and GN9 (Figure 3). These nets were set within a depth range of 2.5 to 22.0 m, which encompasses the habitat depth preference of this species (<10 m for spawning, Langhorne et al 2001). Typically, northern pike are associated with shallower littoral zone areas (<3 m) with finer substrates and abundant submergent/emergent macrophyte cover as these areas provide suitable habitat for spring spawning and for foraging by both juvenile and adult fish (Langhorne et al 2001). The warmer, shallower bays of Ketchikan Lake have areas of higher macrophyte abundance (Photos 4, 10 and 11) which would be suitable for northern pike.

Lake herring

Lake herring were caught in the highest abundance between experimental gill nets GN1, GN2, GN4, GN5, GN7, and GN8. These net sets encompassed a wide variety of habitat types ranging from deeper profundal areas to shallower, littoral areas with woody debris or aquatic macrophyte cover or heavily laden with boulder/cobble (i.e. Photos 7, 9, 11). Young of year, juvenile and adult fish typically exhibit a preference for these deeper water habitats as areas that likely provide both forage and protection from predation (Table 7). Areas of coarse substrates, woody debris and macrophyte vegetation are also utilized by lake herring for spawning and as nursery and rearing habitat by younger fish (Table 7).

Walleye

Walleye were caught in experimental gill nets GN2, GN3, GN4, GN5, GN6 and GN9. These nets were set within a depth range of 1.0 to 25.0 m. Walleye were caught in the profundal (deep water level below effective light penetration) zone as well as in habitat types whose substrates consisted predominately of boulder/cobble, often with woody debris or emergent vegetation (i.e. Photos 7, 9 and 10). These coarse substrate types in particular likely provide suitable habitat for spawning. Deeper water depths and a variety of cover types (emergent/submergent plants, woody debris) likely provides suitable habitat for the various life stage of this species (Table 7).

Yellow perch

Only two young of the year yellow perch were captured from one minnow trap (MT2) in an area dominated by boulder/cobble substrate similar to Photo 5. Typical habitat preferences for young of year yellow perch, as well as for juvenile and adult fish include areas that contain finer substrates (i.e. gravel, sand) and cover from aquatic plants (Table 7). Such habitats were observed as being present within Ketchikan Lake (i.e. Photos 2, 4, 7, and 11).

5.0 CONCLUSIONS

Based on the results of the fish population survey, completed during August 2007, it appears that Ketchikan Lake supports a fish community typical of other boreal water lakes; northern pike, lake herring, walleye, and yellow perch.

The limited biometric fish data collected suggests that natural reproduction is occurring in the lake as demonstrated by the range of juvenile to mature fish species that were sampled during the survey. Resident fish community abundance may also be influenced by emigration and immigration from other waterbodies in the watershed. However, given the low catch numbers of all species observed, it is difficult to assess whether these results are indeed reflective of the true productivity of Ketchikan Lake.

The fish habitat assessment of near shore locations (≤2 m of water) and of the deeper, profundal regions of the lake, suggest that a broad range of available habitats are found throughout Ketchikan Lake. At the time of this survey, the lake habitats observed appear suitable to support the various life stages (i.e. spawning, juvenile rearing, adult foraging) of the fish species that were found, including those areas located along the north-eastern portion of the lake.

6.0 LIMITATIONS

This report was prepared for the exclusive use of Landore Resources Canada Inc. The report, which specifically includes all tables, figures and appendices, is based on data and information collected by Golder Associates Ltd. and is based solely on the conditions at the Site at the time of the work, supplemented by historical information and data obtained by Golder Associates Ltd. as described in this report. No assurance is made regarding the accuracy and completeness of these data.

Parts of this report rely on third party information, which was assumed to be factual and accurate. Golder Associates Ltd. therefore accepts no responsibility for the accuracy of the information by third parties.

Golder Associates Ltd. has exercised reasonable skill, care and diligence to assess the information acquired during the preparation of this assessment, but makes no guarantees or warranties as to the accuracy or completeness of this information. This report is based upon and limited by circumstances and conditions acknowledged herein, and upon information available at the time of the site investigations.

Any use which a third party makes of this report, or any reliance on, or decisions to be made based on it, are the responsibilities of such third parties. Golder Associates Ltd. accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

7.0 CLOSURE

We trust that the information presented in this report meets your requirements at this time. Should you have any questions or comments, please do not hesitate to contact the undersigned.

GOLDER ASSOCIATES LTD.

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Aquatic Biologist

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Senior Biologist

EG/RM/JS/ls

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APPENDIX A
FIELD CATCH RECORDS

Golder Associates

FISH SAMPLE RECORD

15/08/07

Project No. 07-1190-0070 Date (d/m/y) ____,2007 Time ____ Personnel JO/GP Task ____

Stream/Waterbody Ketchikan Lake Location (Reach/Site/Station) ____

Tag/Mark Description: Type (Floy/VI) ____ Color ____ Number Series ____ Tag/Mark Location ____

Capture Method	Mesh Size(mm)	Fish No.	Species Code	Fork Length(mm)	Weight (g)	Stage Code	Sex	Maturity Code	Age Structure	TAG Type	TAG Number	Capt/Rel Code	Comments or External Pathology (class/cond)	
GN	145"	0001	LKTR	232	185		F	AD				F	TL 257	Set 1
GN	140	0002	WAEY	282	190			UN	SC				TL 301	Set 2
GN	130	0003	WAEY	366	495		U	UN	SC				TL ~~346~~ 394	Set 3
GN	130	0004	NRPK	640	760		F	AD					TL	Set 3 Tiss.
GN	129	0005	WAEY	391	550		U	MN	SC				TL 416	Set 3
GN	125	0006	LKTR	249	200		U	UN					TL 281	Set 1
GN	120	0007	LKTR	226	150		U	UN					TL 251	Set 1
GN	115	0008	NRPK	424	520		M	UN	NONE				TL 451	Set 2
GN	115	0009	NRPK	357	400		M	UN	SC				TL 805	Set 2
GN	105	0010	WAEY	276	190		M	IM	SC/SP				TL 293	Set 2
GN	120	0011	LKTR	234	170		U	AN				R	TL 261	Set 2
GN	120	0012	LKTR	265	220		U	AD				N	TL 298	Set 2
GN	125	0013	WAEY	293	210		F		SC/SP				TL 311	Set 3
GN	130	0014	NRPK	417	490		U	UN	SC				TL 443	" 3
GN	120	0015	WAEY	292	250		U	UN	IM				TL 311	" 3
GN	120	0016	WAEY	280	205		U	UN	SC			R	TL 300	" 3
GN	120	0017	WAEY	311	270		U	UN	SC				TL 333	" 3
GN	120	0018	WAEY	295	280		U	UN	SC				TL 315	" 3
GN	130	0019	NRPK	506	925		F		DIC/CL				TL 540	" 3 Tiss.
GN	130	0020	WAEY	555	700		M	AD					TL 592	" 3
GN	130	0021	NRPK	713	2700		U	UN	SC			R	TL 751	" 3
Aug 15 GN		0022	WAEY	279	190		U	UN	SC/SP				TL 298	" 3
Aug 16		0023	WAEY	583	1100		U	UN	SC				555 TL	Set 4
GN		0024	WAEY	565	1800		U	UN	SC				594 TL	Set 4
GN		0025	WAEY	605	2150		U	UN	SC				610 TL	Set 4
GN		0026	WAEY	532	1500		U	UN	SC				565 TL	lympho - healed over Set 4
GN		0027	WAEY	517	1600		U	UN	SC				547 TL	Set 4
GN		0028	WAEY	517	1425		U	UN	SC				548 TL	Set 4
GN		0029	LKTR	184	60								206 TL	
GN		0030	LKTR	203	85								219 TL	

Golder Associates

FISH SAMPLE RECORD

Project No. 07-1192-0070 Date (d/m/y) 16/08/07 Time ______ Personnel JD/GP Task ______

Stream/Waterbody Ketchikan L. Location (Reach/Site/Station) ______

Tag/Mark Description: Type (Floy/VI) ______ Color ______ Number Series ______ Tag/Mark Location ______

Capture Method	Mesh Size(mm)	Fish No.	Species Code	Fork Length(mm)	Weight (g)	Stage Code	Sex	Maturity Code	Age Structure	TAG Type	TAG Number	Capt/Rel Code	Comments or External Pathology (class/cond)
GN		0031	LKHR	193	185.		U						220 Set 4
GN		0032	LKHR	257	200.		U						287
GN		0033	LKHR	195	185.		U						220
GN		0034	LKHR	236	159.		U						260
GN		0035	LKHR	183	160.		U						203
GN		0036	WALL	645	2725.		M		SC/SP				687 Set 5
GN		0037	LKHR	157	140.		U						175 Set 5
GN		0038	LKHR	204	195.		U						231 Set 5
GN		0039	LKHR	194	170.		M						211 Set 5
GN		0040	LKHR	192	110.		U						216 Set 5
GN		0041	LKHR	204	185.		U						226 Set 5
GN		0042	LKHR	187	170.		U						215 Set 5
GN		0043	LKHR	174	145.		U						184 Set 5
GN		0044	WALL	351	1140.		F						270 Set 6 Tiss
GN		0045	NRPK	511	950.		M						539 Set 6 Tiss
		0046	NRPK	516	1050.		U						Set 9
		47	LKHR	202	185.								222 Set 7
		48	LKHR	206	100.								233 7
		49	LKHR	168	30.								186 7
		50	LKHR	217	110.								244 7
		51	LKHR	209	120.								230 7
		52	LKHR	185	85.								206 7
		53	LKHR	211	105.								235 7
		54	LKHR	222	135.								249 Set 8
		55	LKHR	245	190.								269
		56	LKHR	235	185.								260
		57	LKHR	212	110.								243
		58	LKHR	204	90.								229
		59	LKHR	213	100.								237 Set 8
		60	LKHR	162	40.								178

Golder Associates

FISH SAMPLE RECORD

Project No. 07-1192-0070 Date (d/m/y) 17/08/07 Time ______ Personnel GP/JD Task FISH COMMUNITY SURVE

Stream/Waterbody Ketchikan Lake Location (Reach/Site/Station) ______

Tag/Mark Description: Type (Floy/VI) ______ Color ______ Number Series ______ Tag/Mark Location ______

Capture Method	Mesh Size(mm)	Fish No.	Species Code	Fork Length(mm)	Weight (g)	Stage Code	Sex	Maturity Code	Age Structure	TAG Type	TAG Number	Capt/Rel Code	Comments or External Pathology (class/cond)
GN		61	LKHR	228	110.		U	T	~~SC~~ None				246 Set 7
GN		62	WRPK	540	950.		U	T	SC				573 Set 9
GN		63	KOKE	327	320.		U	T	SC				344 Set 9
GN		64	WAKK	498	1400.		M	Ad	SC/SP				534 Set 9 TISS

GILL NET CATCH RECORD

Page 1 of ____

Golder Associates

Proj. No. 07 1192 0070 Proj. Title: Landore Task: [illegible] Personnel JD/GP

Stream/Waterbody Ketchikan Lake

Location (Reach/Site/Station) South side of Lake

Set 1

	Map UTM Coordinates	~~GPS Location/File~~	GPS Waypoint
Position:	16U 0435544/5579906N	16U 0435567E	005
Habitat Type/Description	Deep, soft bottom set	5579781N	006

Sampling Effort:	Net Set	Net Lifted	Net Checked	Net Checked	Net Checked
Date (d/m/y)	15/08/07	15/08/07	15/08/07	15/08/07	
Time (hrs)	10:48	19:23	12:44	15:53	

Net Dimensions: Overall Net Length (m) 120 Net Depth(m) 2 Experimental mesh 1½ to 5"

Number of Panels 8	Panel 1	Panel 2	Panel 3	Panel 4	Panel 5
Length (m)					
Mesh (cm)					

Depth Of Set (m): Minimum 9.0 Maximum 22

Support Data: Air Temp(°C) 14 Cloud Cover(%) 0 Wind(dir/rate) W/10 km/hr

Water Temp(°C) 19.3 D.O.(mg/L) 9.50 Cond.(umhos) 88 pH 7.40

Secchi Depth(m) ____ Turbidity (NTU) ____

Species Code	Captured				TOTAL
	Fry	Juvenile	Adult	Unknown	
LKHE			1 (=1)		

Number of fish is in addition to those on Fish Sample Record ____

Number of fish includes those on Fish Sample Record ____

Photo Reference: Roll No. ____

Photo No. ____

GILL NET CATCH RECORD

Page 1 of ___

Golder Associates

Proj. No. 071192 0070 Proj. Title: Landore Task: Personnel JO/GP set 2

Stream/Waterbody Kekchikan Lake

Location (Reach/Site/Station) _____

	Map UTM Coordinates	GPS Location/File	GPS Waypoint
Position:	16U 043 4991 E WP 007 5580154 N	16U 043 4829 WP 008 5580104 N	
Habitat Type/Description	near island west end		

Sampling Effort:	Net Set	Net Lifted	Net Checked	Net Checked	Net Checked
Date (d/m/y)	15/08/07	15/08/07	15/08/07	15/08/07	
Time (hrs)	11:20	19:05	13:09	14:12	

Net Dimensions: Overall Net Length (m) 120 Net Depth(m) 2 Experimental mesh 1½" to 5"

Number of Panels ___	Panel 1	Panel 2	Panel 3	Panel 4	Panel 5
Length (m)					
Mesh (cm)					

Depth Of Set (m): Minimum 1.0 Maximum 2.5

Support Data: Air Temp(°C) 14 Cloud Cover(%) 70 Wind(dir/rate) W 15 km/hr

Water Temp(°C) 19.25 D.O.(mg/L) 8.93 Cond.(umhos) 88 pH 7.59

Secchi Depth(m) ___ Turbidity (NTU) ___

Species Code	Captured				TOTAL
	Fry	Juvenile	Adult	Unknown	
WALL		1			
		1			
					1
					1

Number of fish is in addition to those on Fish Sample Record ___ Photo Reference: Roll No. ___

Number of fish includes those on Fish Sample Record ___ Photo No. ___

GILL NET CATCH RECORD

Page 2 of ____

Golder Associates

Proj. No. 07-1195-0070 Proj. Title: Landore Task: Personnel JO/GP

Stream/Waterbody Ketchikan Lake

Location (Reach/Site/Station) near drilling zone

Set 3

	Map UTM Coordinates	GPS Location/File	GPS Waypoint
Position:	16404358 38 wp009	04 35795 wp010	
Habitat Type/Description	5580506	5580640	

Sampling Effort:	Net Set	Net Lifted	Net Checked	Net Checked	Net Checked
Date (d/m/y)	15/08/07	15/08/07	15/08/07		
Time (hrs)	11:58	19:38	13:22		

Net Dimensions: Overall Net Length (m) 120 Net Depth(m) 2 Experimental Mesh 1.5" to 5"

Number of Panels ____	Panel 1	Panel 2	Panel 3	Panel 4	Panel 5
Length (m)					
Mesh (cm)					

Depth Of Set (m): Minimum 1.0 Maximum 8.0

Support Data: Air Temp(°C) ____ Cloud Cover(%) 80 Wind(dir/rate) W 15 km

Water Temp(°C) 19.47 D.O.(mg/L) 9.44 Cond.(umhos) 88 pH 6.89

Secchi Depth(m) ____ Turbidity (NTU) ____

Species Code	Captured				TOTAL
	Fry	Juvenile	Adult	Unknown	
WALL					
NRPK					

Number of fish is in addition to those on Fish Sample Record ____

Number of fish includes those on Fish Sample Record ____

Photo Reference: Roll No. ____

Photo No. ____

GILL NET CATCH RECORD

Page 1 of 1

Golder Associates 07 1192 0070 Candore

Proj. No. ___ Proj. Title: Task: Personnel JD/GP

Stream/Waterbody Ketchikan

Location (Reach/Site/Station) South west portion of lake Set #4

	Map UTM Coordinates	GPS Location/File	GPS Waypoint
Position:	0435949 wp014 5580185	0435856 wp015 5580197 wp015	
Habitat Type/Description			

Sampling Effort:	Net Set	Net Lifted	Net Checked	Net Checked	Net Checked
Date (d/m/y)	16/08/07	16/08/07			
Time (hrs)	08:05	15:20			

Net Dimensions: Overall Net Length (m) 120 Net Depth(m) ___ Experimental Mesh 1.5" to 5"

Number of Panels ___	Panel 1	Panel 2	Panel 3	Panel 4	Panel 5
Length (m)					
Mesh (cm)					

Depth Of Set (m): Minimum 9.0 Maximum ~22

Support Data: Air Temp(°C) ___ Cloud Cover(%) 10 Wind(dir/rate) W 15 km

Water Temp(°C) ___ D.O.(mg/L) ___ Cond.(umhos) ___ pH ___

Secchi Depth(m) ___ Turbidity (NTU) ___

Species Code	Captured				TOTAL
	Fry	Juvenile	Adult	Unknown	

Number of fish is in addition to those on Fish Sample Record ___

Number of fish includes those on Fish Sample Record ___

Photo Reference: Roll No. ___

Photo No. ___

GILL NET CATCH RECORD

Set 5

Golder Associates

Proj. No. 07-1192-0070 Proj. Title: Landore Task: Personnel JD/GP

Stream/Waterbody: Katchikan Lake

Location (Reach/Site/Station): middle of Lake

	Map UTM Coordinates		GPS Location/File		GPS Waypoint
Position:	0435826	wp016	0435708	018 wp	
Habitat Type/Description	5580360		5580334		

Sampling Effort:	Net Set	Net Lifted	Net Checked	Net Checked	Net Checked
Date (d/m/y)	16/08/07	16/08/07			
Time (hrs)	08:28	16:10			

Net Dimensions: Overall Net Length (m) 120 Net Depth(m) ____ Exp Mesh 1.5 to 5"

Number of Panels ____	Panel 1	Panel 2	Panel 3	Panel 4	Panel 5
Length (m)					
Mesh (cm)					

Depth Of Set (m): Minimum 20 m Maximum ?

Support Data: Air Temp(°C) ____ Cloud Cover(%) 10 Wind(dir/rate) W 15 km

Water Temp(°C) ____ D.O.(mg/L) ____ Cond.(umhos) ____ pH ____

Secchi Depth(m) ____ Turbidity (NTU) ____

Species Code	Captured				TOTAL
	Fry	Juvenile	Adult	Unknown	

Number of fish is in addition to those on Fish Sample Record ____

Number of fish includes those on Fish Sample Record ____

Photo Reference: Roll No. ____

Photo No. ____

GILL NET CATCH RECORD

Page 1 of ____

Golder Associates 07-1192-0070 Landore

Proj. No. 4 Proj. Title: Task: Personnel GP/JD

Stream/Waterbody Ketchikan Lake

Location (Reach/Site/Station) East end of lake Set #6

	Map UTM Coordinates	GPS Location/File	GPS Waypoint
Position:	0436149 wp020	0436119 wp021	
Habitat Type/Description	5580633	5580490	

Sampling Effort:	Net Set	Net Lifted	Net Checked	Net Checked	Net Checked
Date (d/m/y)	16/08/07	16/08/07			
Time (hrs)	8:40	16:40			

Net Dimensions: Overall Net Length (m) 120 Net Depth(m) ____ Exp. Mesh 1.5" to 5"

Number of Panels ____	Panel 1	Panel 2	Panel 3	Panel 4	Panel 5
Length (m)					
Mesh (cm)					

Depth Of Set (m): Minimum 4.8 Maximum 6.0

Support Data: Air Temp(°C) ____ Cloud Cover(%) 10 Wind(dir/rate) W/15 km

Water Temp(°C) ____ D.O.(mg/L) ____ Cond.(umhos) ____ pH ____

Secchi Depth(m) ____ Turbidity (NTU) ____

Species Code	Captured				TOTAL
	Fry	Juvenile	Adult	Unknown	

Number of fish is in addition to those on Fish Sample Record ____ Photo Reference: Roll No. ____

Number of fish includes those on Fish Sample Record ____ Photo No. ____

GILL NET CATCH RECORD

Page 5 of ____

Golder Associates

Proj. No. 071920070 Proj. Title: Landore Task: Personnel JO/GP

Stream/Waterbody Ketchikan Lake

Location (Reach/Site/Station) off bedrock outcrop on north side of Lake set 7

	Map UTM Coordinates	GPS Location/File	GPS Waypoint
Position:	0435051 wp 026	0435080 wp027	
Habitat Type/Description	5580304	5580190	

Sampling Effort:	Net Set	Net Lifted	Net Checked	Net Checked	Net Checked
Date (d/m/y)	17/08/07	17/08/07	17/08/07		
Time (hrs)	08:00	13:38	12:07		

Net Dimensions: Overall Net Length (m) 120 Net Depth(m) ____ Experimental Mesh 1.5 for 5

Number of Panels ____	Panel 1	Panel 2	Panel 3	Panel 4	Panel 5
Length (m)					
Mesh (cm)					

Depth Of Set (m): Minimum 6.0 Maximum 24

Support Data: Air Temp(°C) 10°c Cloud Cover(%) 95 Wind(dir/rate) W 5 km/hr

Water Temp(°C) 17.5 D.O.(mg/L) 8.0 mg/L Cond.(umhos) ____ pH ____

Secchi Depth(m) 2.16 Turbidity (NTU) ____

Species Code	Captured				TOTAL
	Fry	Juvenile	Adult	Unknown	

Number of fish is in addition to those on Fish Sample Record ____ Photo Reference: Roll No. ____

Number of fish includes those on Fish Sample Record ____ Photo No. ____

GILL NET CATCH RECORD

Page ___ of ___

Golder Associates 071192 0070 Lanbore

Proj. No. ___ Proj. Title: ___ Task: ___ Personnel ___

Stream/Waterbody Ketchikan Lake

Location (Reach/Site/Station) East end of Lake near Island Set # 8

	Map UTM Coordinates	GPS Location/File	GPS Waypoint
Position:	0434998 WP 028	0434874 WP029	
Habitat Type/Description	5580046	5580019	

Sampling Effort:	Net Set	Net Lifted	Net Checked	Net Checked	Net Checked
Date (d/m/y)	17/08/07	17/08/07	17/08/07		
Time (hrs)	08:15	13:16	12:30		

Net Dimensions: Overall Net Length (m) 120 Net Depth(m) ___ Exp. Mesh 1.5 to 5

Number of Panels ___	Panel 1	Panel 2	Panel 3	Panel 4	Panel 5
Length (m)					
Mesh (cm)					

Depth Of Set (m): Minimum 8.0 Maximum 24.0

Support Data: Air Temp(°C) 10°C Cloud Cover(%) 90 Wind(dir/rate) W 5 km

Water Temp(°C) 17.5 D.O.(mg/L) 8.0 mg/L Cond.(umhos) 88 pH ___

Secchi Depth(m) 2.16 Turbidity (NTU) ___

Species Code	Captured				TOTAL
	Fry	Juvenile	Adult	Unknown	

Number of fish is in addition to those on Fish Sample Record ___ Photo Reference: Roll No. ___

Number of fish includes those on Fish Sample Record ___ Photo No. ___

GILL NET CATCH RECORD

Page 1 of ____

Golder Associates 071192 0070 Landore

Proj. No. _____ Proj. Title: _____ Task: _____ Personnel JD / GP

Stream/Waterbody Ketchikan Lake

Location (Reach/Site/Station) North side of lake near pumping station Set #9

	Map UTM Coordinates	GPS Location/File	GPS Waypoint
Position:	0435799 wp30	0435724 wp031	
Habitat Type/Description	5580440	5580533	

Sampling Effort:	Net Set	Net Lifted	Net Checked	Net Checked	Net Checked
Date (d/m/y)	17/08/07	17/08/07	17/08/07		
Time (hrs)	08:35	13:54	11:35		

Net Dimensions: Overall Net Length (m) 120 Net Depth(m) _____ Exp. Mesh 1.5" to 5"

Number of Panels ____	Panel 1	Panel 2	Panel 3	Panel 4	Panel 5
Length (m)					
Mesh (cm)					

Depth Of Set (m): Minimum 2.5 Maximum 18

Support Data: Air Temp(°C) 10 Cloud Cover(%) 90 Wind(dir/rate) W/10km

Water Temp(°C) 17.5 D.O.(mg/L) 8.0 mg/L Cond.(umhos) 88 pH 6.5 - strip

Secchi Depth(m) 2.16m Turbidity (NTU) _____

Species Code	Captured				TOTAL
	Fry	Juvenile	Adult	Unknown	
NRPK					
WALL					

Number of fish is in addition to those on Fish Sample Record ____ Photo Reference: Roll No. ____

Number of fish includes those on Fish Sample Record ____ Photo No. ____

Golder Associates

MINNOW TRAP CATCH RECOR

Proj./Task #07-1192 0070 Proj. Title Landfare Personnel JD/GP
Stream/Waterbody Ketchikan Lake Site near pumping station
Location Description near pumping station

GPS UTM Coordinates: NAD 83 Zone 16 *Set Location*: E 0435 721 N 55 80 615
Habitat Type/Description woody debris near shore - Pumping station

	Start	Finish	
Sampling Information: Date: (d/m/y)	15/08/07	17/08/07	No. of Traps 3
Sampling Time:	09:30	08:45	Total Sampling Effort (# trap-hrs) ___

Checked @ 09:00 Aug 16, 07

Trap Details: *Baited* Yes ✓ No ___ *Trap Type* Standard GEE ✓ Other (describe) ___
Depth of Set (m): Minimum 1.0 Maximum 1.0

Support Data: Air Temp(°C) 10°C Cloud Cover(%) 20 Wind(dir/rate) W/10k Precipitation NONE
Water Temp(°C) 17°C D.O.(mg/L) 8.0 mg/L pH 6.5 - strip
Cond.(uS/cm) 85 Secchi Depth(m) ___ Turbidity (NTU) ___

Species Code	# Captured				TOTAL
	Fry	Juvenile	Adult	Unknown	
	NO FISH CAPTURED				

Golder Associates

MINNOW TRAP CATCH RECOR

Proj./Task # 07 1192 0070 Proj. Title Landore Personnel JD/GP
Stream/Waterbody Ketchikan Lake Site
Location Description east end of lake @ inlet stream mouth

GPS UTM Coordinates: NAD 83 Zone 16 *Set Location*: E 0436384 N 5580470
Habitat Type/Description weedy area near beaver lodge and stream inlet

Sampling Information: Date: (d/m/y) Start 15/08/07 Finish 17/08/07 No. of Traps 3
Sampling Time: 09:57 08:54 Total Sampling Effort (# trap-hrs)

Check 8:52 - 16 Aug 07

Trap Details: *Baited* Yes ✓ No ___ *Trap Type* Standard GEE ✓ Other (describe)
Depth of Set (m): Minimum 1.0 Maximum 1.2

Support Data: Air Temp(°C) 10°C Cloud Cover(%) 10 Wind(dir/rate) W/10km Precipitation NONE
Water Temp(°C) 19°C D.O.(mg/L) 4mg/L pH 6.5 - pH strip
Cond.(*u*S/cm) 88 Secchi Depth(m) Turbidity (NTU)

Species Code	# Captured				TOTAL
	Fry	Juvenile	Adult	Unknown	
	No Fish Captured!!				

Golder Associates

MINNOW TRAP CATCH RECOR

Proj./Task # 07-1192-0070 Proj. Title Landore Personnel JO/GP
Stream/Waterbody Ketchikan Lake Site
Location Description rocky shoreline, mouth of large bay on south side of lake

GPS UTM Coordinates: NAD 83 Zone 16 *Set Location*: E 0435767 N 5579720
Habitat Type/Description boulder and bedrock shoreline

Sampling Information: Date: (d/m/y) Start 15/08/07 Finish 17/08/07 No. of Traps 2
Sampling Time: 10:09 09:02 Total Sampling Effort (# trap-hrs) ✓

Checked @ 10:00 Aug 16, 07

Trap Details: *Baited* Yes ✓ No ___ *Trap Type* Standard GEE ✓ Other (describe) ___
Depth of Set (m): Minimum 0.80 Maximum 1.0

Support Data: Air Temp(°C) ~10 Cloud Cover(%) 0 Wind(dir/rate) W/10 km Precipitation NONE
Water Temp(°C) 19 °C D.O.(mg/L) 7.0 mg/L pH high G.D-strip
Cond.(uS/cm) 88 Secchi Depth(m) ___ Turbidity (NTU) ___

Species Code	# Captured				TOTAL
	Fry	Juvenile	Adult	Unknown	
Yellow Perch	11 2				2

APPENDIX B
LABORATORY ANALYTICAL CERTIFICATES

Sample Name: L2-S | **Date: 8/17/2007** | **Matrix: Water** | **Lab #: 135453**

Hardness/ICP				
Parameter	**MDL**	**Result**	**Units**	**QAQCID**
Magnesium	0.004	3.65	mg/L	20070822.R13H
Total Hardness (as CaCO3)	0.1	48.6	mg/L	20070822.R13H

ICPMS Dis. Water				
Parameter	**MDL**	**Result**	**Units**	**QAQCID**
Dissolved Aluminum	1	17.2	ug/L	20070822.R13D
Dissolved Antimony	0.5	<0.5	ug/L	20070822.R13D
Dissolved Arsenic	1	<1	ug/L	20070822.R13D
Dissolved Barium	1	5.1	ug/L	20070822.R13D
Dissolved Berylium	0.5	<0.5	ug/L	20070822.R13D
Dissolved Bismuth	1	<1	ug/L	20070822.R13D
Dissolved Boron	2	5.4	ug/L	20070822.R13D
Dissolved Cadmium	0.1	<0.1	ug/L	20070822.R13D
Dissolved Calcium	50	10500	ug/L	20070822.R13D
Dissolved Cerium	1	<1	ug/L	20070822.R13D
Dissolved Cesium	1	<1	ug/L	20070822.R13D
Dissolved Chromium	1	<1	ug/L	20070822.R13D
Dissolved Cobalt	0.1	<0.1	ug/L	20070822.R13D
Dissolved Copper	1	<1	ug/L	20070822.R13D
Dissolved Europium	1	<1	ug/L	20070822.R13D
Dissolved Gallium	1	<1	ug/L	20070822.R13D
Dissolved Iron	20	<20	ug/L	20070822.R13D
Dissolved Lanthanum	1	<1	ug/L	20070822.R13D
Dissolved Lead	1	<1	ug/L	20070822.R13D
Dissolved Lithium	5	<5	ug/L	20070822.R13D
Dissolved Magnesium	4	2730	ug/L	20070822.R13D
Dissolved Manganese	1	<1	ug/L	20070822.R13D
Dissolved Mercury	0.1	<0.1	ug/L	20070822.R13D
Dissolved Molybdenum	1	<1	ug/L	20070822.R13D
Dissolved Nickel	1	1.1	ug/L	20070822.R13D
Dissolved Niobium	1	<1	ug/L	20070822.R13D
Dissolved Rubidium	1	1.2	ug/L	20070822.R13D
Dissolved Scandium	1	<1	ug/L	20070822.R13D
Dissolved Selenium	1	<1	ug/L	20070822.R13D
Dissolved Silver	0.1	<0.1	ug/L	20070822.R13D
Dissolved Strontium	1	14.1	ug/L	20070822.R13D
Dissolved Thallium	0.1	<0.1	ug/L	20070822.R13D
Dissolved Thorium	1	<1	ug/L	20070822.R13D
Dissolved Tin	1	<1	ug/L	20070822.R13D
Dissolved Titanium	1	<1	ug/L	20070822.R13D
Dissolved Tungsten	1	<1	ug/L	20070822.R13D
Dissolved Uranium	1	<1	ug/L	20070822.R13D
Dissolved Vanadium	1	<1	ug/L	20070822.R13D
Dissolved Yttrium	1	<1	ug/L	20070822.R13D
Dissolved Zinc	1	1.1	ug/L	20070822.R13D
Dissolved Zirconium	1	<1	ug/L	20070822.R13D

Sample Name: L2-S | **Date: 8/17/2007** | **Matrix: Water** | **Lab #: 135453**

ICPMS Tot. Water				
Parameter	**MDL**	**Result**	**Units**	**QAQCID**
Total Aluminum	1	30.2	ug/L	20070822.R13F
Total Antimony	0.5	<0.5	ug/L	20070822.R13F
Total Arsenic	1	<1	ug/L	20070822.R13F
Total Barium	1	5.4	ug/L	20070822.R13F
Total Berylium	0.5	<0.5	ug/L	20070822.R13F
Total Bismuth	1	<1	ug/L	20070822.R13F
Total Boron	2	6.1	ug/L	20070822.R13F
Total Cadmium	0.1	<0.1	ug/L	20070822.R13F
Total Calcium	500	14400	ug/L	20070822.R13F
Total Cerium	1	<1	ug/L	20070822.R13F
Total Cesium	1	<1	ug/L	20070822.R13F
Total Chromium	1	<1	ug/L	20070822.R13F
Total Cobalt	0.1	<0.1	ug/L	20070822.R13F
Total Copper	1	<1	ug/L	20070822.R13F
Total Europium	1	<1	ug/L	20070822.R13F
Total Gallium	1	<1	ug/L	20070822.R13F
Total Iron	20	33	ug/L	20070822.R13F
Total Lanthanum	1	<1	ug/L	20070822.R13F
Total Lead	1	<1	ug/L	20070822.R13F
Total Lithium	5	<5	ug/L	20070822.R13F
Total Magnesium	4	3940	ug/L	20070822.R13F
Total Manganese	1	3.2	ug/L	20070822.R13F
Total Mercury	0.1	<0.1	ug/L	20070822.R13F
Total Molybdenum	1	<1	ug/L	20070822.R13F
Total Nickel	1	1.5	ug/L	20070822.R13F
Total Niobium	1	<1	ug/L	20070822.R13F
Total Rubidium	1	1.3	ug/L	20070822.R13F
Total Scandium	1	<1	ug/L	20070822.R13F
Total Selenium	1	<1	ug/L	20070822.R13F
Total Silver	0.1	<0.1	ug/L	20070822.R13F
Total Strontium	1	15.6	ug/L	20070822.R13F
Total Thallium	0.1	<0.1	ug/L	20070822.R13F
Total Thorium	1	<1	ug/L	20070822.R13F
Total Tin	1	<1	ug/L	20070822.R13F
Total Titanium	1	<1	ug/L	20070822.R13F
Total Tungsten	1	<1	ug/L	20070822.R13F
Total Uranium	1	<1	ug/L	20070822.R13F
Total Vanadium	1	<1	ug/L	20070822.R13F
Total Yttrium	1	<1	ug/L	20070822.R13F
Total Zinc	1	2.1	ug/L	20070822.R13F
Total Zirconium	1	<1	ug/L	20070822.R13F

TDS				
Parameter	**MDL**	**Result**	**Units**	**QAQCID**
Total Dissolved Solids	25	68	mg/L	20070824.R27A

Sample Name: L2-S | **Date: 8/17/2007** | **Matrix: Water** | **Lab #: 135453**

TOC Water				
Parameter	**MDL**	**Result**	**Units**	**QAQCID**
Total Organic Carbon	0.4	15	mg/L	20070904.R55.2A

TP Water				
Parameter	**MDL**	**Result**	**Units**	**QAQCID**
Total Phosphorus (as P)	0.002	0.023	mg/L	20070828.R23.2A

TSS				
Parameter	**MDL**	**Result**	**Units**	**QAQCID**
Total Suspended Solids	6	<6	mg/L	20070824.R27B

Sample Name: L2-M | **Date: 8/17/2007** | **Matrix: Water** | **Lab #: 135454**

Alk by FIA				
Parameter	**MDL**	**Result**	**Units**	**QAQCID**
M-Alkalinity as CaCO3 (pH 4.5)	10	45	mg/L	20070823.R69A

AmmoniaFIA				
Parameter	**MDL**	**Result**	**Units**	**QAQCID**
Ammonia (as N)	0.002	0.03	mg/L	20070823.R42D

Anions Water				
Parameter	**MDL**	**Result**	**Units**	**QAQCID**
Chloride	0.2	0.33	mg/L	20070822.R5B
Fluoride	0.1	<0.1	mg/L	20070822.R5B
Nitrate (as N)	0.1	<0.1	mg/L	20070822.R5B
Nitrite (as N)	0.03	<0.03	mg/L	20070822.R5B
Sulfate	1	1	mg/L	20070822.R5B

DOC Water				
Parameter	**MDL**	**Result**	**Units**	**QAQCID**
Dissolved Organic Carbon	0.4	12	mg/L	20070824.R55.1A

Hardness/ICP				
Parameter	**MDL**	**Result**	**Units**	**QAQCID**
Calcium	0.05	12.9	mg/L	20070822.R13H
Magnesium	0.004	3.55	mg/L	20070822.R13H
Total Hardness (as CaCO3)	0.1	46.9	mg/L	20070822.R13H

ICPMS Dis. Water				
Parameter	**MDL**	**Result**	**Units**	**QAQCID**
Dissolved Aluminum	1	17.3	ug/L	20070822.R13D
Dissolved Antimony	0.5	<0.5	ug/L	20070822.R13D
Dissolved Arsenic	1	<1	ug/L	20070822.R13D
Dissolved Barium	1	4.2	ug/L	20070822.R13D
Dissolved Berylium	0.5	<0.5	ug/L	20070822.R13D
Dissolved Bismuth	1	<1	ug/L	20070822.R13D
Dissolved Boron	2	5	ug/L	20070822.R13D
Dissolved Cadmium	0.1	<0.1	ug/L	20070822.R13D
Dissolved Calcium	50	10500	ug/L	20070822.R13D
Dissolved Cerium	1	<1	ug/L	20070822.R13D

Sample Name: L2-M **Date: 8/17/2007** **Matrix: Water** **Lab #: 135454**

ICPMS Dis. Water				
Parameter	**MDL**	**Result**	**Units**	**QAQCID**
Dissolved Cesium	1	<1	ug/L	20070822.R13D
Dissolved Chromium	1	<1	ug/L	20070822.R13D
Dissolved Cobalt	0.1	<0.1	ug/L	20070822.R13D
Dissolved Copper	1	<1	ug/L	20070822.R13D
Dissolved Europium	1	<1	ug/L	20070822.R13D
Dissolved Gallium	1	<1	ug/L	20070822.R13D
Dissolved Iron	20	<20	ug/L	20070822.R13D
Dissolved Lanthanum	1	<1	ug/L	20070822.R13D
Dissolved Lead	1	<1	ug/L	20070822.R13D
Dissolved Lithium	5	<5	ug/L	20070822.R13D
Dissolved Magnesium	4	2710	ug/L	20070822.R13D
Dissolved Manganese	1	<1	ug/L	20070822.R13D
Dissolved Mercury	0.1	<0.1	ug/L	20070822.R13D
Dissolved Molybdenum	1	<1	ug/L	20070822.R13D
Dissolved Nickel	1	1.1	ug/L	20070822.R13D
Dissolved Niobium	1	<1	ug/L	20070822.R13D
Dissolved Rubidium	1	1.2	ug/L	20070822.R13D
Dissolved Scandium	1	<1	ug/L	20070822.R13D
Dissolved Selenium	1	<1	ug/L	20070822.R13D
Dissolved Silver	0.1	<0.1	ug/L	20070822.R13D
Dissolved Strontium	1	13.9	ug/L	20070822.R13D
Dissolved Thallium	0.1	<0.1	ug/L	20070822.R13D
Dissolved Thorium	1	<1	ug/L	20070822.R13D
Dissolved Tin	1	<1	ug/L	20070822.R13D
Dissolved Titanium	1	<1	ug/L	20070822.R13D
Dissolved Tungsten	1	<1	ug/L	20070822.R13D
Dissolved Uranium	1	<1	ug/L	20070822.R13D
Dissolved Vanadium	1	<1	ug/L	20070822.R13D
Dissolved Yttrium	1	<1	ug/L	20070822.R13D
Dissolved Zinc	1	1.2	ug/L	20070822.R13D
Dissolved Zirconium	1	<1	ug/L	20070822.R13D

ICPMS Tot. Water				
Parameter	**MDL**	**Result**	**Units**	**QAQCID**
Total Aluminum	1	27.8	ug/L	20070822.R13F
Total Antimony	0.5	<0.5	ug/L	20070822.R13F
Total Arsenic	1	<1	ug/L	20070822.R13F
Total Barium	1	5	ug/L	20070822.R13F
Total Berylium	0.5	<0.5	ug/L	20070822.R13F
Total Bismuth	1	<1	ug/L	20070822.R13F
Total Boron	2	6.3	ug/L	20070822.R13F
Total Cadmium	0.1	<0.1	ug/L	20070822.R13F
Total Calcium	500	13600	ug/L	20070822.R13F
Total Cerium	1	<1	ug/L	20070822.R13F
Total Cesium	1	<1	ug/L	20070822.R13F
Total Chromium	1	<1	ug/L	20070822.R13F

Sample Name: L2-M | **Date: 8/17/2007** | **Matrix: Water** | **Lab #: 135454**

ICPMS Tot. Water				
Parameter	**MDL**	**Result**	**Units**	**QAQCID**
Total Cobalt	0.1	<0.1	ug/L	20070822.R13F
Total Copper	1	<1	ug/L	20070822.R13F
Total Europium	1	<1	ug/L	20070822.R13F
Total Gallium	1	<1	ug/L	20070822.R13F
Total Iron	20	20	ug/L	20070822.R13F
Total Lanthanum	1	<1	ug/L	20070822.R13F
Total Lead	1	<1	ug/L	20070822.R13F
Total Lithium	5	<5	ug/L	20070822.R13F
Total Magnesium	4	3780	ug/L	20070822.R13F
Total Manganese	1	2.8	ug/L	20070822.R13F
Total Mercury	0.1	<0.1	ug/L	20070822.R13F
Total Molybdenum	1	<1	ug/L	20070822.R13F
Total Nickel	1	1.4	ug/L	20070822.R13F
Total Niobium	1	<1	ug/L	20070822.R13F
Total Rubidium	1	1.2	ug/L	20070822.R13F
Total Scandium	1	<1	ug/L	20070822.R13F
Total Selenium	1	<1	ug/L	20070822.R13F
Total Silver	0.1	<0.1	ug/L	20070822.R13F
Total Strontium	1	15.1	ug/L	20070822.R13F
Total Thallium	0.1	<0.1	ug/L	20070822.R13F
Total Thorium	1	<1	ug/L	20070822.R13F
Total Tin	1	<1	ug/L	20070822.R13F
Total Titanium	1	<1	ug/L	20070822.R13F
Total Tungsten	1	<1	ug/L	20070822.R13F
Total Uranium	1	<1	ug/L	20070822.R13F
Total Vanadium	1	<1	ug/L	20070822.R13F
Total Yttrium	1	<1	ug/L	20070822.R13F
Total Zinc	1	3.9	ug/L	20070822.R13F
Total Zirconium	1	<1	ug/L	20070822.R13F

TDS				
Parameter	**MDL**	**Result**	**Units**	**QAQCID**
Total Dissolved Solids	25	76	mg/L	20070824.R27A

TOC Water				
Parameter	**MDL**	**Result**	**Units**	**QAQCID**
Total Organic Carbon	0.4	12	mg/L	20070823.R55.2B

TP Water				
Parameter	**MDL**	**Result**	**Units**	**QAQCID**
Total Phosphorus (as P)	0.002	0.025	mg/L	20070828.R23.2A

TSS				
Parameter	**MDL**	**Result**	**Units**	**QAQCID**
Total Suspended Solids	6	<6	mg/L	20070824.R27B

Sample Name: L2-B | **Date: 8/17/2007** | **Matrix: Water** | **Lab #: 135455**

Alk by FIA				
Parameter	**MDL**	**Result**	**Units**	**QAQCID**
M-Alkalinity as CaCO3 (pH 4.5)	10	87	mg/L	20070823.R69A

AmmoniaFIA				
Parameter	**MDL**	**Result**	**Units**	**QAQCID**
Ammonia (as N)	0.002	0.052	mg/L	20070823.R42D

Anions Water				
Parameter	**MDL**	**Result**	**Units**	**QAQCID**
Chloride	0.2	0.48	mg/L	20070822.R5B
Fluoride	0.1	<0.1	mg/L	20070822.R5B
Nitrate (as N)	0.1	<0.1	mg/L	20070822.R5B
Nitrite (as N)	0.03	<0.03	mg/L	20070822.R5B
Sulfate	1	1.1	mg/L	20070822.R5B

DOC Water				
Parameter	**MDL**	**Result**	**Units**	**QAQCID**
Dissolved Organic Carbon	0.4	7	mg/L	20070824.R55.1A

Hardness/ICP				
Parameter	**MDL**	**Result**	**Units**	**QAQCID**
Calcium	0.05	13.4	mg/L	20070822.R13H
Magnesium	0.004	3.09	mg/L	20070822.R13H
Total Hardness (as CaCO3)	0.1	46.2	mg/L	20070822.R13H

ICPMS Dis. Water				
Parameter	**MDL**	**Result**	**Units**	**QAQCID**
Dissolved Aluminum	1	18.8	ug/L	20070822.R13D
Dissolved Antimony	0.5	<0.5	ug/L	20070822.R13D
Dissolved Arsenic	1	<1	ug/L	20070822.R13D
Dissolved Barium	1	4.6	ug/L	20070822.R13D
Dissolved Berylium	0.5	<0.5	ug/L	20070822.R13D
Dissolved Bismuth	1	<1	ug/L	20070822.R13D
Dissolved Boron	2	2.6	ug/L	20070822.R13D
Dissolved Cadmium	0.1	<0.1	ug/L	20070822.R13D
Dissolved Calcium	50	12400	ug/L	20070822.R13D
Dissolved Cerium	1	<1	ug/L	20070822.R13D
Dissolved Cesium	1	<1	ug/L	20070822.R13D
Dissolved Chromium	1	<1	ug/L	20070822.R13D
Dissolved Cobalt	0.1	<0.1	ug/L	20070822.R13D
Dissolved Copper	1	<1	ug/L	20070822.R13D
Dissolved Europium	1	<1	ug/L	20070822.R13D
Dissolved Gallium	1	<1	ug/L	20070822.R13D
Dissolved Iron	20	<20	ug/L	20070822.R13D
Dissolved Lanthanum	1	<1	ug/L	20070822.R13D
Dissolved Lead	1	<1	ug/L	20070822.R13D
Dissolved Lithium	5	<5	ug/L	20070822.R13D
Dissolved Magnesium	4	2530	ug/L	20070822.R13D
Dissolved Manganese	1	<1	ug/L	20070822.R13D

Sample Name: L2-B | **Date: 8/17/2007** | **Matrix: Water** | **Lab #: 135455**

ICPMS Dis. Water				
Parameter	**MDL**	**Result**	**Units**	**QAQCID**
Dissolved Mercury	0.1	<0.1	ug/L	20070822.R13D
Dissolved Molybdenum	1	<1	ug/L	20070822.R13D
Dissolved Nickel	1	1.1	ug/L	20070822.R13D
Dissolved Niobium	1	<1	ug/L	20070822.R13D
Dissolved Rubidium	1	1.2	ug/L	20070822.R13D
Dissolved Scandium	1	<1	ug/L	20070822.R13D
Dissolved Selenium	1	<1	ug/L	20070822.R13D
Dissolved Silver	0.1	<0.1	ug/L	20070822.R13D
Dissolved Strontium	1	13.8	ug/L	20070822.R13D
Dissolved Thallium	0.1	<0.1	ug/L	20070822.R13D
Dissolved Thorium	1	<1	ug/L	20070822.R13D
Dissolved Tin	1	<1	ug/L	20070822.R13D
Dissolved Titanium	1	<1	ug/L	20070822.R13D
Dissolved Tungsten	1	<1	ug/L	20070822.R13D
Dissolved Uranium	1	<1	ug/L	20070822.R13D
Dissolved Vanadium	1	<1	ug/L	20070822.R13D
Dissolved Yttrium	1	<1	ug/L	20070822.R13D
Dissolved Zinc	1	1.2	ug/L	20070822.R13D
Dissolved Zirconium	1	<1	ug/L	20070822.R13D

ICPMS Tot. Water				
Parameter	**MDL**	**Result**	**Units**	**QAQCID**
Total Aluminum	1	28.6	ug/L	20070822.R13F
Total Antimony	0.5	<0.5	ug/L	20070822.R13F
Total Arsenic	1	<1	ug/L	20070822.R13F
Total Barium	1	4.9	ug/L	20070822.R13F
Total Berylium	0.5	<0.5	ug/L	20070822.R13F
Total Bismuth	1	<1	ug/L	20070822.R13F
Total Boron	2	4.7	ug/L	20070822.R13F
Total Cadmium	0.1	<0.1	ug/L	20070822.R13F
Total Calcium	500	13900	ug/L	20070822.R13F
Total Cerium	1	<1	ug/L	20070822.R13F
Total Cesium	1	<1	ug/L	20070822.R13F
Total Chromium	1	<1	ug/L	20070822.R13F
Total Cobalt	0.1	0.14	ug/L	20070822.R13F
Total Copper	1	<1	ug/L	20070822.R13F
Total Europium	1	<1	ug/L	20070822.R13F
Total Gallium	1	<1	ug/L	20070822.R13F
Total Iron	20	36	ug/L	20070822.R13F
Total Lanthanum	1	<1	ug/L	20070822.R13F
Total Lead	1	<1	ug/L	20070822.R13F
Total Lithium	5	<5	ug/L	20070822.R13F
Total Magnesium	4	3590	ug/L	20070822.R13F
Total Manganese	1	2.7	ug/L	20070822.R13F
Total Mercury	0.1	<0.1	ug/L	20070822.R13F
Total Molybdenum	1	<1	ug/L	20070822.R13F

Sample Name: L2-B | **Date: 8/17/2007** | **Matrix: Water** | **Lab #: 135455**

ICPMS Tot. Water				
Parameter	**MDL**	**Result**	**Units**	**QAQCID**
Total Nickel	1	1.2	ug/L	20070822.R13F
Total Niobium	1	<1	ug/L	20070822.R13F
Total Rubidium	1	1.3	ug/L	20070822.R13F
Total Scandium	1	1.7	ug/L	20070822.R13F
Total Selenium	1	<1	ug/L	20070822.R13F
Total Silver	0.1	<0.1	ug/L	20070822.R13F
Total Strontium	1	14.3	ug/L	20070822.R13F
Total Thallium	0.1	<0.1	ug/L	20070822.R13F
Total Thorium	1	<1	ug/L	20070822.R13F
Total Tin	1	<1	ug/L	20070822.R13F
Total Titanium	1	<1	ug/L	20070822.R13F
Total Tungsten	1	<1	ug/L	20070822.R13F
Total Uranium	1	<1	ug/L	20070822.R13F
Total Vanadium	1	<1	ug/L	20070822.R13F
Total Yttrium	1	<1	ug/L	20070822.R13F
Total Zinc	1	1.5	ug/L	20070822.R13F
Total Zirconium	1	1.4	ug/L	20070822.R13F

TDS				
Parameter	**MDL**	**Result**	**Units**	**QAQCID**
Total Dissolved Solids	25	83	mg/L	20070824.R27A

TOC Water				
Parameter	**MDL**	**Result**	**Units**	**QAQCID**
Total Organic Carbon	0.4	11	mg/L	20070823.R55.2B

TP Water				
Parameter	**MDL**	**Result**	**Units**	**QAQCID**
Total Phosphorus (as P)	0.002	0.021	mg/L	20070828.R23.2A

TSS				
Parameter	**MDL**	**Result**	**Units**	**QAQCID**
Total Suspended Solids	6	<6	mg/L	20070824.R27B

Sample Name: L3-S | **Date: 8/17/2007** | **Matrix: Water** | **Lab #: 135456**

Alk by FIA				
Parameter	**MDL**	**Result**	**Units**	**QAQCID**
M-Alkalinity as CaCO3 (pH 4.5)	10	76	mg/L	20070823.R69A

AmmoniaFIA				
Parameter	**MDL**	**Result**	**Units**	**QAQCID**
Ammonia (as N)	0.002	0.033	mg/L	20070823.R42D

Anions Water				
Parameter	**MDL**	**Result**	**Units**	**QAQCID**
Chloride	0.2	0.25	mg/L	20070822.R5B
Fluoride	0.1	<0.1	mg/L	20070822.R5B
Nitrate (as N)	0.1	<0.1	mg/L	20070822.R5B