EXECUTIVE SUMMARY
FISH COMMUNITY AND HABITAT EXISTING CONDITIONS REPORT

First Mining Gold (First Mining) has completed a comprehensive Fish Community and Habitat Existing Conditions Report which has utilized an extensive multi-year data base to characterize the fish communities and habitats present in the Springpole Lake study area. A summary of the report findings are outlined herein but the key results and conclusions are:

- Lake trout are utilizing multiple deep basins within Springpole lake as cold-water refuges during the summer months,
- Lake trout move freely to both upstream and downstream lakes in the fall and return in the late spring,
- There are several lake trout spawning shoals in Springpole lake,
- No walleye have been observed spawning within the project footprint in Springpole Lake, and;
- No lake sturgeon or other endangered fish species are present in Springpole Lake.

First Mining believes the data support the hypothesis that temporary de-watering of the north basin of Springpole Lake during the life of the mine should not put the populations of the two most recreationally important fish species, lake trout and walleye, or any of the other species that reside in the lake at risk. First Mining will continue working with Fisheries and Oceans Canada (DFO) to develop fishery off-setting measures that will help to mitigate any short or long-term effects to local fish communities.

Report Summary

First Mining Gold and its predecessor company Gold Canyon Resources Inc. initiated numerous baseline environmental studies beginning as early as 2010. First Mining has continued in this endeavor and has conducted numerous environmental baseline programs at the site for the purpose of providing the necessary data and site characterization information to support an Environmental Assessment (EA) and permitting for the project. Beginning in 2011, an extensive and comprehensive assessment program has been carried out to describe the fish community and habitat in surface water bodies that are within the project area (Figures 1, 2 & 3).

The objectives of the fish community and habitat assessment program have been to:

- Document and map the type, extent, and utilization of fish habitat within the project area,
- Collect baseline data sets for the selected waterbodies that meet the requirements of section 27.1 of the Metal Mining Effluent Regulations, EIS Guidelines, and Section 35 of the Fisheries Act for Fisheries offsetting plans,
- Confirm and characterize the fish community composition and relative abundance of species within the selected waterbodies, and;
- Confirm that no threatened or endangered fish species are present in any of the water bodies studied.

From a regional perspective, the Springpole Lake property is within Ontario Fisheries Management Zone (FMZ) 4. Management zones are geographic regions characterized by similar ecological, physical, social, and economic attributes. The FMZ 4 Background Information Report provides a summary of the Zone characteristics. FMZ 4 covers an area of 60,440 km^2 extending from the Manitoba border in the west to the boundaries of Brightsand River and Wabakimi Provincial Parks in the east. The zone extends north from the Trans-Canada Highway to the Berens and Cat River Systems. Within the zone boundary, there are 22,000 lakes and over 44,000 km of river and stream habitat. A total of 17% of the FMZ 4 area is permanent water, and an additional 5% is wetland. The majority of the zone is within the Nelson River primary watershed. Nearly 80% of the land base drains west through the English River system via Lake Winnipeg and the Nelson River to Hudson Bay. The remaining 20% of the zone is within the Hudson Bay - James Bay primary watershed. Springpole Lake is located in the northeast quadrant of FMZ 4 and is part of the Hudson Bay - James Bay watershed. Its waters flow east through the Birch River system, eventually reaching Lake St. Joseph and James Bay via the Cat and Albany Rivers.

Springpole Lake has a predominantly rocky shoreline and contains numerous islands and rocky shoals. The Birch River is its largest tributary and it enters at the southwest end of Springpole Lake through a short section of rapids downstream from Cromarty Lake. There are also a number of small tributary streams flowing into Springpole Lake. The outflow of Springpole Lake is also through the Birch River, at the east end, into Gull Lake. Springpole Lake has a surface area of 2861 Ha; the project footprint includes 6% of that area. Overall, Springpole has a maximum depth of 35.1 m and an average depth of 6.3 m. The portion of Springpole Lake that is within the project footprint has an average depth of 13 m.

The northern portion of Springpole Lake, within which the project is located, is 4.5 km wide and 6.5 km long. It is generally deeper and more open than the east arm of the lake and has three large basins exceeding 30 m in depth. The lake has an additional three deep basins exceeding 20m in depth. The east arm of Springpole Lake is 17.7 km long. Much of that length is a narrow channel bound by a steep bedrock wall along the north shore.

To date, fish and fish habitat studies have been carried out on Springpole Lake, 12 small unnamed waterbodies and 9 small tributary streams in the project area. A brief summary of each study component is included in Table 1 (A & B) appended to this memo.

Springpole Lake as well as nearby Birch and Seagrave Lakes support diverse fish communities including sport species common to both cold-water (Lake Trout and Whitefish) and cool-water lakes (Walleye, Northern Pike, and Yellow Perch); and a number of other non-game and forage fish (Table 1 A). Among the 12 small lakes surveyed; 6 host fish communities that include sport species including Yellow Perch and Northern Pike; 4 host only forage species; and two are considered devoid of fish. Of the 9 small streams surveyed, the largest and best connected to lakes support Yellow Perch and other forage fish. The smaller, more ephemeral streams typically support only forage fish species.

Table 1. (A) Summary of Fisheries Assessment Surveys completed on Springpole Lake.

SPRINGPOLE LAKE				
Survey type	**Survey Methods**	**Years Surveyd**	**Seasons Sampled**	**Summary**
Fish Community	Community Index netting	2011, 2012	Summer/Fall	A total of 13 overnight gill nets set between Fall of 2011 (FWIN) and summer 2012 (NASIN). In descending order of Catch Per Unit Effort (CPUE) the fish catptured in this survey include: Walleye, Yellow Perch, Cisco, Lake Whitefish, Spottail Shiner, White Sucker, Northern Pike, Burbot, Log Perch, Lake Trout, Rock Bass and Shorthead Redhorse.
	Minnow Traps	2011, 2012, 2013	Spring/Summer/Fall	Minnow traps were set at 83 locations throughout Springpole Lake. In descending order of Catch Per Unit Effort (CPUE) the fish catptured in this survey include: Yellow Perch, Spottail Shiner, White Sucker, Brook Stickleback and Rock Bass
	Beach Seining	2013, 2015	Summer/Fall	A 4' x 50' bag-less seine net (1/4" mesh) was used to sample 6 near-shore locations on Springpole Lake. In descending order of Catch Per Unit Effort (CPUE) the fish catptured in this survey include: Yellow Perch, Spottail Shiner, Mimic Shiner, Blacknose Shiner, Johnny Darter, Common Shiner, Iowa Darter, Trout Perch, White Sucker, Log Perch, Fathead Minnow, Walleye, Northerm Pike, Brook Stickleback, Bluntnose Minnow, River Darter and Sculpin
Fish Habitat	Bathymetry	2012, 2013	Spring/Summer/Fall	Information used for the characterization of habitat in Springpole Lake was collected with a Hummingbird 798ci HD Side Imaging Sonar with internal GPS.geo-referenced sonar return information from transects totalling approximately 200 km in length. Most of these transects were used for calculating both depth and bottom hardness, with a subset of more widely spaced parallel transects used to collect side-scan imaging.
	Substrate and Aquatic Vegetation	2012, 2013	Spring/Summer/Fall	To delineate the distribution and type of aquatic macrophytes and further characterize nearshore substrates, 219 transects most perpendicular to the shoreline within the mapped area of Springpole Lake were examined with an underwater video camera. Substrate type and vegetation type/amount were characterized along each transect, and GPS waypoints were taken at transition points. Where prominent features (e.g. boulder piles, bedrock outcrops, beds of aquatic plants) were encountered that could be directly observed from the surface, the edges of these features were delineated with GPS waypoints.
	Spawning Locations	2012-2017	Spring/Fall	To identify spawning habitat within the northern portion of Springpole Lake, a visual survey of the shoreline, islands, and reefs was completed. Submersible LED spotlights were used with a 14' aluminum boat to scan the bottom substrates along each shoreline segment for night spawning groups of fish (Lake Trout, Walleye and Whitefish).To identify Northern Pike spawning habitat, the shoreline was visually surveyed by boat during daylight hours. Areas with dense aquatic vegetation were observed for a period of time to count fish present and note indicators of spawning activity. All spawning surveys were completed when surface waters in the lake were within a suitable range for spawning to occur. All observations of the target species were recorded and marked by handheld GPS. Observations were coded in the field as to whether spawning behaviour was observed or not.
	Water Quality	2011 to 2018	Spring/Summer/Fall/ Winter	As many as seven surface water sampling stations were sampled quarterly in Springpole Lake between 2011 and 2018 results from this sampling program have been compared against the Provincial Water Quality Objectives for Ontario (MOECC 1999). PWQO are chemical and physical indicators that have and set to establish a measurable level of water quality that is protective of all aquatic life and life cycle stages during indefinite exposure to the water. This is an ongoing monitoring program at the site
	Lake Stratification	2011 to 2018	Spring/Summer/Fall/ Winter	Temperature, Dissolved Oxygen, pH and Conductivity were sampled in the 6 deepest basins of Springpole Lake between 2011 and 2018. In general terms the conditions measured throughout the water column in Springpole Lake are suitable to support fish populations. Average conditions during thermal stratification in Springpole Lake, determined by pooling all temperature, D.O., and pH measurements taken in Springpole Lake from 2011 through 2016 (n=20).This is an ongoing monitoring program at the site
Fish Migration	Acoustic Telemetry	2012 to 2018 (Ongoing)	Spring/Summer/Fall/ Winter	A telemetry study was undertaken to investigate the habitat use and movements of Walleye and Lake Trout. In 2012 and 2013, acoustic tags (transmitters) were implanted in both Walleye and Lake Trout captured in the portion of Springpole Lake that would be isolated and dewatered if a mine was developed. In 2015 acoustic tags were implanted in Lake Trout captured at four known Lake Trout spawning areas in Springpole Lake, including locations that would be isolated and dewatered and others that would not. Acoustic recievers were installed at 21 locations in Springpole Lake and the Birch River to passively record the movements of tagged fish. The telemetry study is expected to continue until 2020.
Species At Risk (SAR)	Fish Community Surveys	2011 - 2015	Spring/Summer/Fall	No aquatic Species at Risk were captured during any fish community survey completed on Springpole Lake.
	Lake Sturgeon Presence/Absence	2012, 2013	Spring/Summer	A presence/absence netting program for Lake Sturgeon was carried out over the course of two years on Springpole Lake. The study area consisted of Springpole Lake and sections of the Birch River, extending upstream from Springpole Lake to the outflow of Satterly Lake and downstream to the entrance of Gull Lake. A total of 52 net sets were conducted during the survey. However, no sturgeon were captured. Likewise, no sturgeon have been caught in any other fish capture gear utilized in fish community surveys conducted in Springpole Lake (2011 - 2015) or by MNRF on Birch Lake in 2009. At this time Lake Sturgeon are not considered present in Springpole Lake.

Table 1. (B) Summary of Fisheries Assessment Surveys completed on Small Lakes and Streams.

SMALL LAKES AND STREAMS				
Survey type	**Survey Methods**	**Years Surveyd**	**Seasons Sampled**	**Summary**
Fish Community - Small Lakes	Community Index Netting, and Fish Traps	2012-2015	Spring/Summer/Fall	A total of 12 small lakes within the project claim area were sampled between 2012 and 2017. All of these lakes have a surface area less than 20 Ha. The fish community assessment data for small lakes was collected using a variation of the Ontario Ministry of Natural Resources (OMNR) Broad-scale Fish Community Monitoring Protocol as well as other passive capture techniques, including minnow trapping, hoop netting, and fyke netting. Among the 12 lakes surveyed, 6 host fish communities that include sport species including Yellow Perch and Northern Pike; 4 host only baitfish species; and two, L-4 and L-6 are considered devoid of fish.
Fish Habitat - Small Lakes	Bathymetry and Habitat Mapping	2012-2015	Summer/Fall	Fish habitat observations were made by visually surveying the 12 waterbodies and mapping habitat features including substrate type, shoreline characteristics, aquatic vegetation, and features like beaver lodges. In deep areas, ponar grab samples were taken to confirm substrate type. Depth measurements for bathymetric mapping were collected by using GPS equipped sonar or, in a few cases, using a metered line and handheld GPS.
Fish Community and Habitat - Small Streams	Electrofisher, Fish Traps and Visual Observation	2012-2017	Spring, Summer, Fall	In all, nine small watercourses that flow into Springpole Lake were surveyed for fish community and habitat between 2012 and 2017. A variety of capture methods were employed to determine the fish species present in each stream including fish traps, electrofishing and drift nettinig. General habitat descriptions were developed from field observations and channel measurements, detailed stream habitat mapping is expected to be complete in 2018. Among the 9 small streams those with the largest channels, and greatest degree of connectivity support Yellow Perch and other baitfish. The smaller more ephemeral streams typically hosted only baitfish species. In one case, Stream 25 no fish have been captured and it is considered devoid of fish at this time.
Species At Risk	Fish Community Surveys	2012-2017	Spring, Summer, Fall	No aquatic Species at Risk were captured during any fish community sampling completed on the 11 small lakes and 9 small streams surveyed.

Figure 1. Springpole Lake and Similar Nearby Waterbodies.

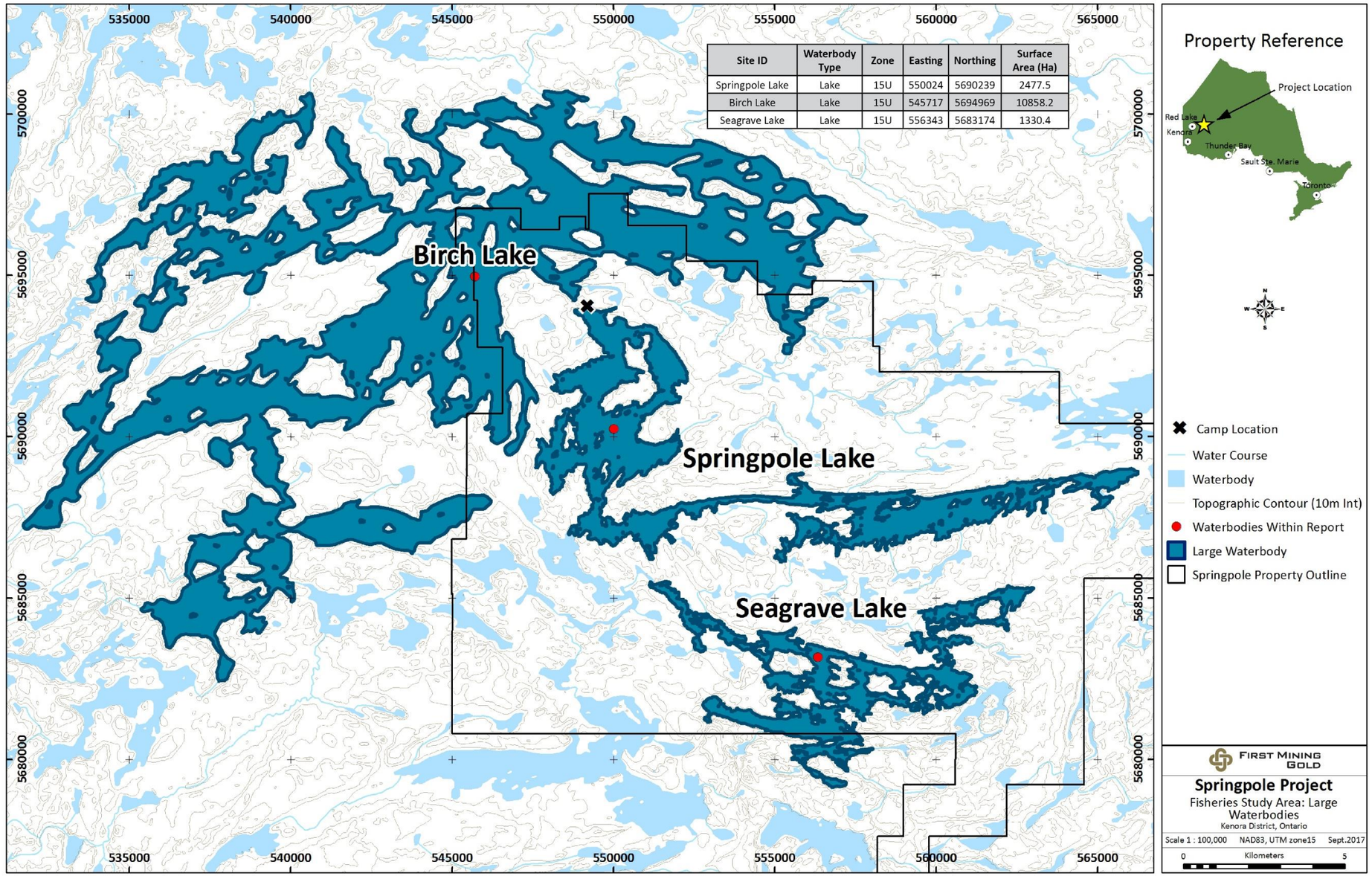
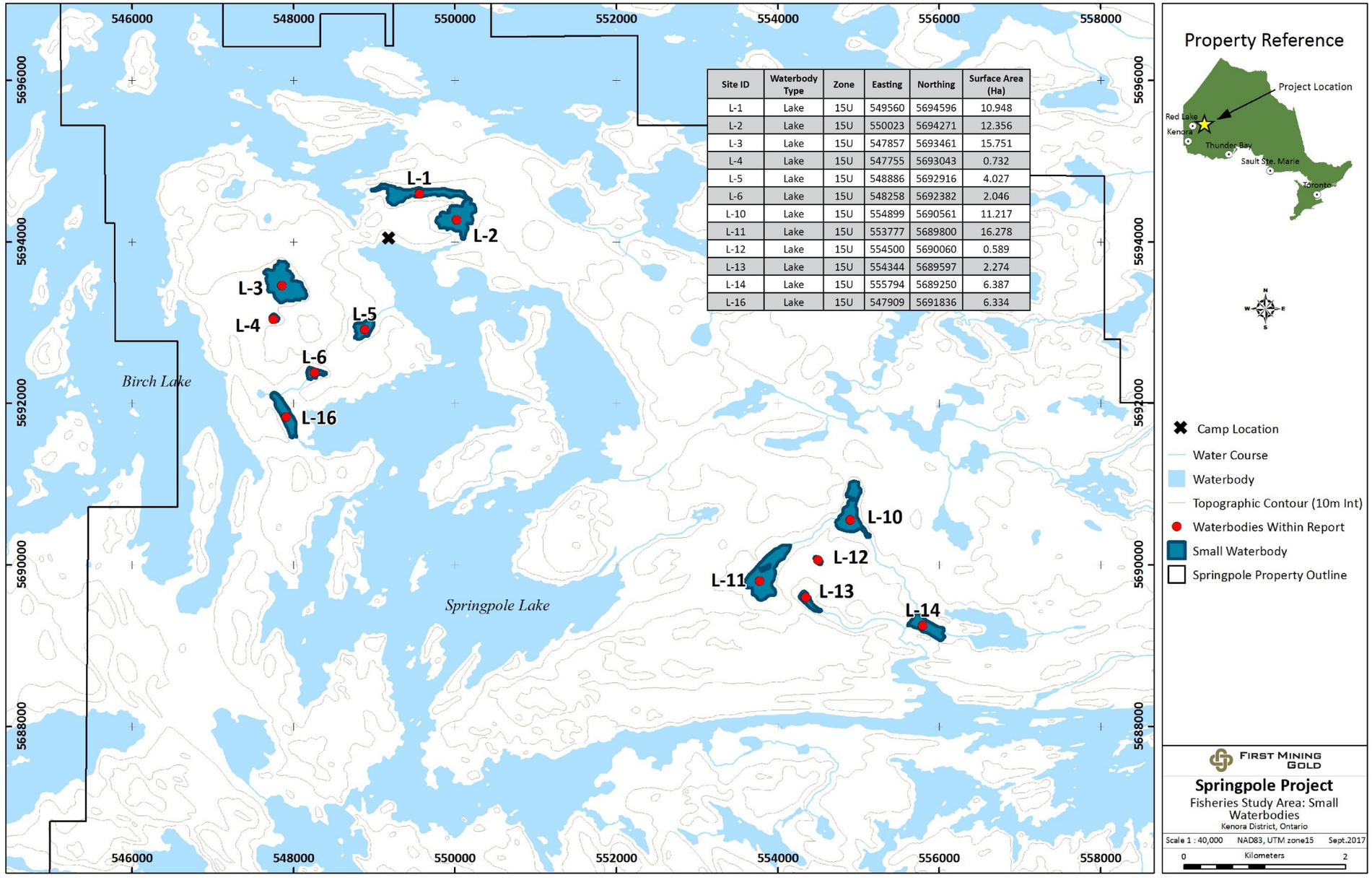
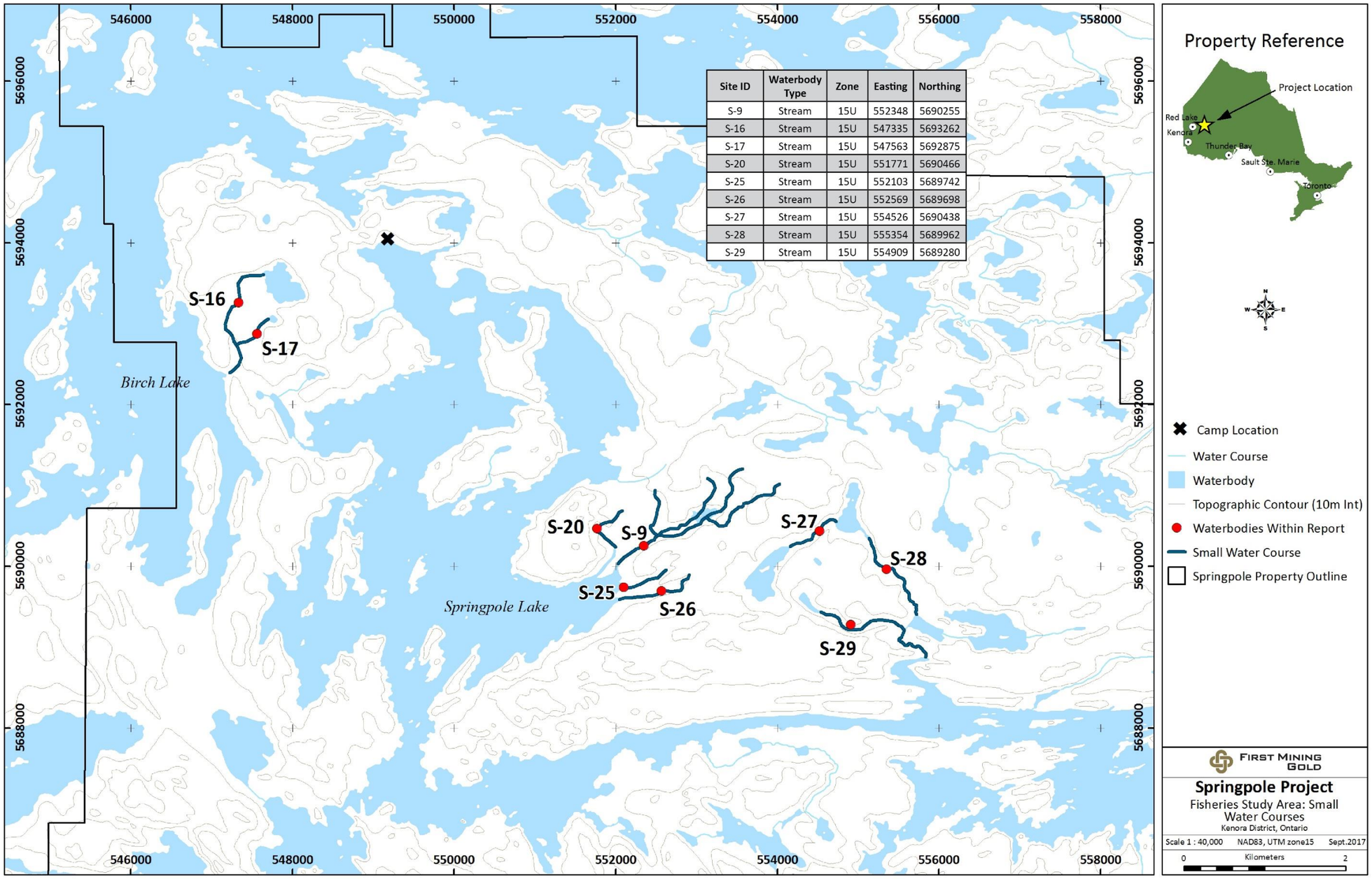


Figure 2. Small Lakes Surveyed.



Site ID	Waterbody Type	Zone	Easting	Northing	Surface Area (Ha)
L-1	Lake	15U	549560	5694596	10.948
L-2	Lake	15U	550023	5694271	12.356
L-3	Lake	15U	547857	5693461	15.751
L-4	Lake	15U	547755	5693043	0.732
L-5	Lake	15U	548886	5692916	4.027
L-6	Lake	15U	548258	5692382	2.046
L-10	Lake	15U	554899	5690561	11.217
L-11	Lake	15U	553777	5689800	16.278
L-12	Lake	15U	554500	5690060	0.589
L-13	Lake	15U	554344	5689597	2.274
L-14	Lake	15U	555794	5689250	6.387
L-16	Lake	15U	547909	5691836	6.334

Figure 3. Small Streams Surveyed



Site ID	Waterbody Type	Zone	Easting	Northing
S-9	Stream	15U	552348	5690255
S-16	Stream	15U	547335	5693262
S-17	Stream	15U	547563	5692875
S-20	Stream	15U	551771	5690466
S-25	Stream	15U	552103	5689742
S-26	Stream	15U	552569	5689698
S-27	Stream	15U	554526	5690438
S-28	Stream	15U	555354	5689962
S-29	Stream	15U	554909	5689280