MUNICIPAL PLANNING SERVICES

Spring Lake Biophysical Assessment

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CPP ENVIRONMENTAL | Charette Pell Poscente

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PROFESSIONAL SIGNOFF

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To the best of my knowledge and the best of my professional ability, recognizing the standard of care expected of a reasonable professional doing this work, it is my professional opinion that all the information contained in this Professional Report is accurate and complete, and contains all the relevant information for the purposes of this project or application.

This Professional Report, including all attachments, data, and supplemental information, were prepared by me or under my direct supervision and has been reviewed and accepted by me.

All the information submitted is, to the best of my knowledge, true, accurate, and complete.

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1. Introduction

Spring Lake is a small (0.80 km^2), mesotrophic lake located 28 km west of Edmonton in Parkland County (**Appendix 1**). The drainage basin (watershed) for Spring Lake is 16 times larger than the area of the lake itself, though there are no defined inlets to or outlets from the lake. Thus, Spring Lake effectively has no real surface hydrological connection to other waterbodies in the area. The residence time (average amount of time that water stays in a waterbody) for the lake is over 100 years, indicating that very little turnover of water (or dissolved substances) occurs. Groundwater appears to be an important source of water inputs into Spring Lake, as indicated by high amounts of the sulphate ion. Water levels in Spring Lake have been fairly stable since the 1960s, however it wasn't always this way. Since 1939, water levels have fluctuated between a high of 726.36 m in 1939 to a low of 722.99 in 1968. During the years of high water levels, cottages were located adjacent to the water's edge. Now, a wide buffer strip of native vegetation has formed between the cottages and the water's edge, creating a naturalized setting. The water is usually clear, supporting low turbidity and a euphotic zone that often extends to the bottom of the lake, except in five deeper areas.

CPP Environmental completed a terrestrial and aquatic survey in the Village of Spring Lake and in adjacent aquatic areas on July 7 and 8, 2020 (**Appendices 2, 3**). The survey included documentation of fish and wildlife, wildlife habitat, wetland and ecosite classification, and riparian health. Where available, information provided by external sources was incorporated into the report. A summary of terrestrial, riparian, and aquatic characteristics is described below. Site photographs are presented in **Appendix 4**.

2. Background

Prior to the field survey, a desktop review of Alberta Environment and Parks (AEP) resources was completed, as follows:

- The Alberta Conservation Information Management System (ACIMS) was accessed to document rare plants within the project boundaries. No sensitive species or non-sensitive species were documented (**Appendix 5**).
- The Fish and Wildlife Internet Mapping Tool (FWIMT) was accessed to document previously recorded fish and wildlife observations (**Appendix 6**).
- A Landscape Analysis Tool (LAT) report was generated to document land features such as sensitive wildlife features, historical resources, and land management conditions (**Appendix 7**). The LAT report shows no potential of historic resources in the Village.
- Water depth data (bathymetric contours) from the *Atlas of Alberta Lakes* were accessed to assist with field planning (**Appendix 1**).

3. Aquatic Habitats

The aquatic survey was completed by kayak within 50 m of Spring Lake's 6.3 km shoreline on July 7, 2020. Field measurements included percent cover of different substrate and vegetation types along reaches defined in the field (**Appendix 2**). An individual reach was defined while travelling parallel to the shoreline, as follows. The first reach began at the southern end of the Village. When a notable change in substrate or vegetation type occurred, a waypoint was created to mark the end of the reach and the start of the next reach. At each waypoint, water quality was measured using an Aqua TROLL 600 multi-parameter probe at a depth of 0.5 m. Measured parameters included temperature, conductivity, turbidity, dissolved oxygen, and pH.

The aquatic assessment resulted in a total of four reaches representing the entire near-shore area of the Village (**Appendix 2**). Despite differences in the degree of disturbance and vegetative cover, water quality parameters were relatively similar at all reaches and were at levels suitable to support aquatic life. Submergent vegetation was visible in clear waters and consisted primarily of common mare's tail (*Hippuris vulgaris*), coontail (*Ceratophyllum demersum*), northern milfoil (*Myriophyllum sibiricum*), and pondweed species (*Stuckenia spp.*). The substrate was dominated by fine materials, with some sand and small gravel observed along the boat launches and swimming area (**Table 1**).

Table 1: Aquatic environmental survey data collected at each reach in near-shore areas within the Village.

Characteristics	Reach Number			
	1	2	3	4
Total Reach Length (m)	241	5,970	12	77
Water Quality (30 cm below surface)				
Temperature (°C)	19.97	20.15	20.10	20.03
Conductivity (µS/cm)	696.87	696.60	695.41	696.34
Turbidity (NTU)	0	0	0	0
Dissolved Oxygen (mg/L)	9.87	10.78	10.29	10.46
pH	8.62	8.65	8.62	8.63
Riparian Zone (Average)				
Sedges/Grasses (%)	100	40	0	95
Shrubs (%)	0	30	0	5
Trees (%)	0	30	0	0
Disturbed (%)	100	<5	100	<5
Manicured Lawns (#)	1	0	0	1
Boat Launches/Docks (#)	1	~20	2	2
Riparian Zone Length (m)	0	5-10	0	0-4
Emergent Plant Zone (Average)				
Dominant Veg. Type	Sedges [a]	Cattails/Bulrushes	Sedges	Cattails
Emergent Veg. Zone Width (m)	5 (0) [b]	2-10	<1	0.25-4
Emergent Veg Cover (%)	40 (0) [b]	100	<10	100
Submergent Plant Zone (Average)				
Water depth (m)	~1-2	~1-2	~0.3-1	~0.5-5
Aquatic Veg. Cover (%)	100 (0) [b]	100	0	100
Distance from shore (m)	2 (10) [b]	2-10	5	1
Overhead Cover				
Woody Debris (%)	0	0	0	0

Characteristics	Reach Number			
	1	2	3	4
Overhanging Vegetation (%)	0	15	0	5
Substrate Characteristics				
Fines (%)	10	90	20	90
Sand (%)	90	10	70	10
Sm. Gravel (%)	0	0	10	0
Lg. Gravel (%)	0	0	0	0
Cobble (%)	0	0	0	0
Boulder (%)	0	0	0	0

[a] Area was disturbed. Where vegetation was present, sedges were dominant.

[b] Value indicates emergent zone characteristics where intact; values in parentheses indicate conditions at swimming zone

3.1. Reach 1

Reach 1 accounted for 3.8% of the lakeshore. It was highly disturbed with extensive shoreline disturbance in the form of recreational development, including boat launch, man-made beach, boat storage along shoreline and shoreline vegetation removal/disturbance. Emergent vegetation was not present and submergent vegetation lacked biodiversity and abundance. The submergent vegetation was found up to the shoreline, except within the swimming area. A crayfish (*Orconectes virilis*), which is not native to the area, was found within submergent vegetation in less than 30 cm of water. The land adjacent to the riparian area was developed into a park, with a playground, beach, and a roped off swimming area. Within the swimming area, submergent vegetation was absent and the substrate was predominately sandy, consistent with the beach area. A large floating dock was present and actively used for angling (three anglers were present at the time of the assessment). A deep pool exists near the floating dock, allowing for excellent fishing opportunities. Water depth along this reach was shallow and got progressively deeper. Aquatic species, such as invertebrates and crustaceans, and small forage fish could utilize the shallow depths and submergent vegetation for cover.

3.2. Reach 2

Nearly all of Reach 2 was natural to low disturbance and accounted for 94.7% of the lakeshore. The natural littoral zones were characterized by relatively undisturbed shorelines with abundant emergent and submergent vegetative cover. Low disturbance was characterized by disruptions in the natural connectivity of the shoreline through lake access points from private residences. Typical disturbance found were small trails through riparian area to access docks or floating rafts. The emergent vegetation was apparent on either side of the docks. Natural areas provide nesting and foraging opportunities for waterfowl and provide accessible areas for larger mammals. While conducting the aquatic survey within Reach 2, a male common loon (*Gavia immer*) was encountered while paddling near the emergent vegetation and displaying aggressive defensive behaviors. The emergent vegetation was utilized as nesting habitat for the common loon. The abundance of aquatic vegetation has potential to support habitat for a variety of life stages for species of fish.

3.3. Reaches 3 & 4

Reaches 3 and 4 accounted for 1.4% of the shoreline. They were categorized as moderately disturbed, meaning that emergent vegetation is degraded or less in abundance, submergent vegetation cover is

minimal, and direct access to lake shore is apparent and used frequently resulting in low recovery for aquatic vegetation. Reach 3 is located on private property along the east shore. It is used by the Edmonton Trout Fishing Club through direct access to the lake shore. Within this area, the emergent vegetation was sparse and aquatic vegetation cover was minimal. A floating dock with another boat launch access, just north of the main boat launch, is also utilized. The dock extends into the lake, past emergent vegetation, which is apparent only on the north side of the dock. Reach 4 is located on the southwest bay of the lake. Riparian vegetation, in the form of larger trees and shrubs, have been removed and the emergent vegetation is half the width of that of Reach 2. Much of this clearing has been done years ago and the community is working at restoring these areas. Direct access to the lake shore for launching boats and a floating dock are present. Aquatic vegetation cover was not substantially altered and no floating aquatic vegetation, such as algae and duckweed, were documented.

4. Wetlands

Wetlands are highly diverse, productive ecosystems that provide a variety of ecological services, such as protecting water quality, providing water storage and infiltration, habitat for wildlife, fish and plants and sustaining biodiversity. Wetlands play an important role in sustaining healthy watersheds and are defined as: "*Land saturated with water long enough to promote wetland or aquatic processes as indicated by poorly drained soils, hydrophytic (water loving) vegetation, and various kinds of biological activity that are adapted to a wet environment*." in the *Alberta Wetland Classification System* (AWCS; ESRD 2015).

Wetlands were classified in accordance with the AWCS and included a desktop delineation of wetland boundaries and field verification within project boundaries. Several wetlands were identified within the Village (**Appendix 3**), including shrubby swamps (S-S-III, which have >25% cover of shrubs and often surround marshes and lakes), graminoid marshes (M-G-II, -III and -IV, which are dominated by grass-like vegetation such as sedges), and shallow open water wetlands (W-A-V, which have a large open water areas surrounded by marsh vegetation, and have beaver activity). Most delineated wetlands were within the North portion of the Village, where the Spring Lake Ranch currently is. According to satellite imagery, these wetlands were present prior to the development of the community, thus they are natural in origin. Natural wetlands are protected under the Water Act. A description of the vegetation communities at the various wetland areas within the Village is presented in **Table 2**.

Table 2: Vegetation communities of wetlands within the Village of Spring Lake.

Wetland Classification	Description	Dominant Species
Seasonal Shrubby Swamp (S-S-III)	Shrubs occupying >25% of the wetland area, with mineral soils and water that typically persists into mid-summer	• Willows (*Salix* spp.) • River alder (*Alnus tenuifolia*) • Wild raspberry (*Rubus idaeus*) • Common horsetail (*Equisetum arvense*) • Arrow-leaved coltsfoot (*Petasites sagittatus*) • Stinging nettle (*Urtica dioica*)
Temporary Graminoid Marsh (M-G-II)	Grass-like plants dominate the wetland area, with mineral soils and water that typically persists until early summer	• Marsh reed grass (*Calamagrostis canadensis*) • Manna grasses (*Glyceria* spp.) • Sloughgrass (*Beckmannia syzigachne*)

Wetland Classification	Description	Dominant Species
		• Wild mint (*Mentha arvensis*)
Seasonal Graminoid Marsh (M-G-III)	Grass-like plants dominate the wetland area, with mineral soils and water that typically persists into mid-summer	• Wheat sedge (*Carex atherodes*) • Water sedge (*Carex aquatilus*) • Reed canary grass (*Phalaris arundinacea*) • Wild mint (*Mentha arvensis*)
Semi-permanent Graminoid Marsh (M-G-IV)	Cattails and bulrushes dominate the wetland area, with mineral soils and water that typically persists into late summer	• Common cattail (*Typha latifolia*) • Bulrushes (*Schoenoplectus* spp.) • Wheat sedge (*Carex atherodes*) • Water sedge (*Carex aquatilus*) • Wild mint (*Mentha arvensis*)
Vegetated Permanent Shallow Open Water Wetland (W-A-V)	Grass-like plants and cattails/bulrushes on the edge of the wetland with floating or submerged plants in the central open water area, with mineral soils and water that remains year-round	• Common cattail (*Typha latifolia*) • Bulrushes (*Schoenoplectus* spp.) • Unidentified aquatic plant species • Wheat sedge (*Carex atherodes*) • Water sedge (*Carex aquatilus*) • Wild mint (*Mentha arvensis*)

5. Riparian Areas

Riparian areas are the transitional ecological zones bordering rivers, lakes, and wetlands. They encompass areas of emergent aquatic vegetation, the shoreline, the bank and upwards to areas where plants remain tolerant of water-logged soils. These areas provide important ecological services, including stabilizing lake sediments and terrestrial soils, reducing shoreline erosion, filtering sediment and nutrients from runoff entering the lake, storing water during wet periods and releasing it during dry periods and providing essential habitat for fish and wildlife. Lakeside modification (including construction of buildings along the shoreline, clearing of aquatic and shoreline vegetation, installation and maintenance of lawns and artificial beaches, and placement of docks, boat lifts, concrete and riprap) can degrade riparian health. This can impact water quality and biodiversity by increasing shoreline erosion, degrading fish habitat, and increasing nutrient input which may lead to algal blooms. Thus, a healthy riparian area corresponds with a healthy lake or river.

Generally, the riparian area around Spring Lake is intact and in good (healthy) condition. The riparian area was found to encircle the perimeter of the lake in all areas except where the two resorts exist at the southeast and southwest bays of the lake (**Appendix 3**). The riparian vegetation included emergent vegetation (e.g., cattails) closest to the water's edge and deciduous tree/shrub swamp species (e.g., birch, poplar, willows) further inland. **Table 3** lists the typical species comprising the riparian area around Spring Lake.

In 2018, the North Saskatchewan Watershed Alliance (NSWA) commissioned a riparian area assessment report for the Sturgeon River watershed (Fiera Biological Consulting 2018). The report measured the intactness (amount of breaks in natural vegetation cover and extent of human footprint, with fewer breaks representing better health) of riparian areas for numerous lakes and rivers in the Sturgeon watershed, including Spring Lake. Results show that 72.6% of Spring Lake's 6.3 km shoreline was considered to be moderate to high intactness, while 27.4% of the shoreline was considered to be low to very low intactness. If the Village of Spring Lake wishes to improve riparian and lake health, the areas of moderate to high

intactness should be protected and the low to very low intactness areas should be high priorities for ecological restoration.

Table 3: Vegetation species observed in the riparian areas around Spring Lake.

Tree Stratum	Shrub Stratum	Ground Stratum
• Paper birch (*Betula papyrifera*) • Balsam poplar (*Populus balsamifera*)	• Willows (*Salix* spp.) • Bracted honeysuckle (*Lonicera involucrata*) • Red osier dogwood (*Cornus stolonifera*) • River alder (*Alnus tenuifolia*)	• Marsh reed grass (*Calamagrostis canadensis*) • Reed canary grass (*Phalaris arundinacea*) • Asters (*Aster* spp.) • Common horsetail (*Equisetum arvense*) • Marsh skullcap (*Scutellaria galericulata*) • Arrow-leaved coltsfoot (*Petasites sagittatus*)

A member of the Village's Environmental Committee indicated to CPP Environmental that Himalayan balsam (*Impatiens grandulifera*), a Prohibited Noxious weed, had been found within the Village and steps towards eradication have already commenced. During the biophysical assessment, Himalayan balsam was not encountered however, orange hawkweed (*Hieracium aurantiacum*), another Prohibited Noxious weed, was discovered at three discrete locations (**Appendix 3**) around the lake. As per the *Weed Control Act*, prohibited noxious weeds must be destroyed. Additional information about Orange Hawkweed is presented in **Appendix 8**.

6. Fish and Wildlife Habitat

6.1. Fish

AEP's FWIMT database provides an inventory of the fish species within Spring Lake, based on professional fish surveys. At least five fish species are known to have inhabited Spring Lake, with the last professional survey having been conducted in 2013. Small forage fish species include fathead minnows (*Pimephales promelas*) and brook stickleback (*Culaea inconstans*), with yellow perch (*Perca flavescens*) and rainbow trout (*Oncorhynchus mykiss*) documented as the predatory/sportfish species. Spring Lake is managed as a sport fishery only with no commercial or domestic fisheries supported. The lake used to be stocked with yellow perch for a few years in the 1950s, however, winter kills, and fishing pressure have contributed to population decline over the last 60 years. Brook stickleback and Fathead minnows are the sole indigenous species.

The lake's fish population, and thus the lake food chain, has been significantly altered. Yellow perch has not been documented in the lake since 2012 and 2007, respectively. The lake has been regularly stocked with rainbow trout (*Oncorhynchus mykiss*) every year since 1953 and aerated throughout the winter to prevent winterkill from oxygen depletion under the ice through Alberta Conservation Association Aeration Program. Abundant emergent and submergent vegetation, with deep pools, minimal turbidity, and oxygenated waters provide suitable in-lake habitat for a variety of fish species. However, with no true inlet or outlet; lacking connectivity to streams, and other waterbodies. the lake is hydrologically isolated, which limits the quality of fish habitat. Without hydrological connectivity (where lake meets river/creek), suitable spawning habitat for some large fish species is less abundant. Furthermore, this lack of connectivity means that opportunities for fish to escape undesirable conditions (e.g., low oxygen in winter) are not available, and when populations are altered, little opportunity exists for fish to re-enter the system. From a fish population and fish habitat perspective, Spring Lake is not a productive system.

Fishes in Spring Lake are subject to environmental and anthropogenic pressures such as overfishing and winterkill. According to local information, perch populations have drastically lowered in recent years and do not support sustainable fisheries. The perch have been affected by winterkill events, and with no connectivity of the lake to other waterbodies, there is limited opportunity to replenish the population besides stocking. Most of the fish habitat present in Spring Lake is suitable to support fish at a variety of life stages; however, there is no access to flowing water for spawning. Flowing water during spawning provides oxygen to the eggs and reduced egg smothering from siltation of fine substrate.

Results of the aquatic survey indicate that the 5.2% of the Village's shoreline has been impaired by human disturbance. Submergent vegetation cover was high across Reach 2 and emergent vegetation was absent from Reaches 1, 3 and 4. The abundant vegetation present in Reach 2, could provide important spawning, nursery, rearing and foraging habitat for species like yellow perch as well as a variety of forage fish. Reaches 1, 3, and 4, which demonstrated higher levels of human disturbance and minimal aquatic vegetation, are less likely to provide adequate fish habitat especially for yellow perch which relies heavily on vegetative cover for spawning, rearing, and foraging. Due to the fines-dominated substrate in majority of reaches, these areas are unlikely to provide adequate spawning habitat for rainbow trout (which require fine gravels and running water).

During the aquatic survey and in conversation with representatives of the Village's Environmental Committee, it was apparent that Spring Lake has abundant submerged aquatic vegetation. This vegetation is present due to inherent properties of the lake creating ideal habitat conditions, such as the clear and shallow waters, the fine-textured substrate, and calm waters.

1.1. Wildlife

Wildlife habitat is available throughout the Village within the riparian area surrounding the lake, several wetlands, and the forested areas north, west, and south of the lake. The mature forest provided a variety of habitats, including standing snags, which provide cover, nesting opportunities, and foraging for insects. The riparian areas have the potential to provide foraging and nesting sites for waterfowl, while the forested areas could provide shelter and corridors for mammals and birds. During CPP Environmental's site visit, indications of several mammal species were noted, include muskrat (*Ondatra zibethicus*), beaver (*Castor canadensis*), and coyote (*Canis latrans*). According to local information, large ungulates such as moose (*Alces alces*) are typically observed around Spring Lake in the winter months.

Numerous bird species were observed during CPP Environmental's site visit, as presented in **Table 4**. Birds were active in all visited areas of the Village, though conditions were not favourable for photography. Local information indicates that Spring Lake supports a diverse bird community year-round. Multiple nesting platforms are supplied in the spring to encourage common loon nesting. The nesting platform secured in the southwestern bay is sought after by common loons and has been utilized for many years. Nesting whooping cranes (*Grus americana*) have been documented by landowners and trumpeter swans (*Cygnus buccinator*) have utilized Spring Lake as a feeding location during migration.

Table 4: Bird species observed within the Village of Spring Lake, July 7-8, 2020.

Common Name	Latin Name	Observation Type
American coot	*Fulica americana*	Foraging among emergent vegetation along Spring Lake
American crow	*Corvus brachyrhynchos*	Flying overhead and foraging on ground in forested area south of Spring Lake
American white pelican	*Pelecanus erythrorhynchos*	Congregating on Spring Lake
Bald eagle	*Haliaeetus leucocephalus*	Flying through mature poplar forest north of Spring Lake

Common Name	Latin Name	Observation Type
Common loon	*Gavia immer*	Feeding in Spring Lake with young and nesting in emergent vegetation
Common tern	*Sterna hirundo*	Feeding in Spring Lake
Downy woodpecker	*Dryobates pubsecens*	Feeding in forested area west of Spring Lake
Osprey	*Pandion haliaetus*	Feeding in Spring Lake and soaring overhead
Red-necked grebe	*Podiceps grisegena*	Congregating on water, with young
Red-winged blackbird	*Agelaius phoeniceus*	Perched in emergent vegetation along Spring Lake
Sora	*Porzana carolina*	Overheard in emergent vegetation along Spring Lake
Unidentified gull	*Laridae sp.*	Flying overhead above Spring Lake
Unidentified woodpecker	*Picidae sp.*	Evidence of feeding activity in dead tree in forested area south of Spring Lake

Several of the observed bird species (for example, osprey, bald eagle) are known to overwinter in Canada and may remain around Spring Lake if open water is available for fishing and mature forested areas are available for roosting. Four of the observed species are listed as Sensitive under the Alberta *Wildlife Act*; these are the osprey, bald eagle, American white pelican, and sora.

Many bird feeders and houses were documented throughout the Village and the forested areas provide habitat for songbirds and woodpeckers. Natural areas along the northern boundary may also provide foraging opportunities for whitetail and mule deer, moose and coyotes and smaller mammals such as porcupines, skunks, weasels, hares, and squirrels.

7. Terrestrial Habitats

Terrestrial habitats include forested areas, shrublands and natural grasslands. The Village of Spring Lake is located within the Boreal Forest Natural Region and the Dry Mixedwood sub-region of Alberta. Ecosite classification occurred within the Village boundary for terrestrial areas noted as being of interest during the desktop assessment. Ecosites were identified in accordance with the *Field Guide to Ecosites of Northern Alberta*, based on vegetation and site characteristics (Beckingham and Archibald 1996). **Table 5** presents a list of the vegetation species within the tree, shrub, and ground strata of the terrestrial ecosites visited within the Village.

Table 5: Select terrestrial plant communities within the Village of Spring Lake

Ecosite	Tree Stratum	Shrub Stratum	Ground Stratum
BM-d1.3	• Balsam poplar (Populus balsamifera)	• Prickly rose (*Rosa acicularis*) • Beaked hazelnut (*Corylus cornuta*) • Red osier dogwood (*Cornus stolonifera*) • Saskatoon (Amelanchier alnifolia) • Canada buffaloberry (*Shepherdia canadensis*)	• Star-flowered Solomon's seal (*Smilacina stellata*) • Grasses (*Poaceae)*

Ecosite	Tree Stratum	Shrub Stratum	Ground Stratum
BM-e1.2	• Balsam poplar (Populus balsamifera)	• White spruce (*Picea glauca*) • Willows (*Salix* spp.) • Cow parsnip (*Heracleum maximum*) • Wild raspberry (*Rubus idaeus*) • Prickly rose (*Rosa acicularis*)	• Fireweed (*Epilobium angustifolium*) • Stinging nettle (*Urtica dioica*) • Grasses (*Poaceae*)
BMf1.1	• Paper birch (Betula papyrifera)	• White spruce (*Picea glauca*) • Red osier dogwood (*Cornus stolonifera*) • Bracted honeysuckle (*Lonicera involucrata*) • Prickly rose (*Rosa acicularis*)	• Twinflower (*Linnaea borealis*) • Bunchberry (*Cornus canadensis*) • Common horsetail (*Equisetum arvense*) • Mosses
BM-f2.1	• White spruce (*Picea glauca*)	• Paper birch (Betula papyrifera) • Beaked hazelnut (*Corylus cornuta*) • Red osier dogwood (*Cornus stolonifera*) • Bracted honeysuckle (*Lonicera involucrata*) • Prickly rose (*Rosa acicularis*)	• Twinflower (*Linnaea borealis*) • Bunchberry (*Cornus canadensis*) • Common horsetail (*Equisetum arvense*) • Mosses

Within the Village, there are numerous terrestrial areas that are well-established and intact (**Appendix 3**), with one area standing out as having particularly valuable habitat. The BM-d1.3 ecosite (terrestrial habitat "1" in **Appendix 3**) is a mature balsam poplar stand with trees over 15 m tall, which is uncommon in the Parkland region. The tall trees and diverse understory provide excellent habitat opportunities for various wildlife species. For example, during the biophysical assessment a bald eagle was observed in this forested area.

Land development in this region (residential and agricultural) is extensive and ongoing, and natural habitats are becoming increasingly lost and degraded. Consequently, terrestrial habitats should be protected from development if possible, to retain their ecological value and to maintain ecological connections among the patches of relatively intact areas, which as a whole provide the habitat requirements for many of the species found near the lake.

8. Summary and Recommendations

The Village of Spring Lake is nestled within a surrounding forested area, offering a variety of wildlife viewing opportunities. Environmental management has been a priority in lakeshore development over the years. A variety of initiatives have been implemented to support environmental management at Spring Lake. These initiatives include: banning the use of herbicides; no off-highway vehicle use; buffering riparian and wetland areas; implementing a motorized boat speed limit; education and eradication programs for Prohibited Noxious Weeds; educational pamphlets and signs along shorelines explaining specific environmental sensitivities (e.g., nesting loons); and community educational boards depicting local flora and fauna.

However, the lake can be considered a fragile ecosystem. It has a very long residence time (over 100 years), which is visually evident by a lack of defined inflow and outflow. In other words, the water in the lake is replaced or replenished at a crawl's pace. Thus, any pollutants that enter the lake (e.g., herbicides, fertilizers,

sediment, sewage) are not readily flushed out of the system and remain in the lake for a long time. Due to the hydrological isolation of the lake, water-bound animals are “stuck” within the lake when conditions turn bad (e.g., winterkill events). This highlights the tremendous importance of protecting the lake and its watershed. Watershed protection can best be accomplished through the conservation of wetlands, riparian areas, and in-lake vegetated areas, and by reducing hard surfaces (roads and sidewalks), maintaining natural areas in uplands, minimizing mowed areas (especially near riparian and wetland areas), and nutrient-reducing strategies like inspecting septic systems and minimizing fertilizer usage. Continuing to educate the community and public on the importance of watershed protection will be essential to maintaining a healthy ecosystem for generations to come.

Maintaining (in environmental reserves) and increasing (in lots) the overall cover of natural vegetation will maintain and further attract birds and wildlife within the Village. If possible, keep a non-disturbance buffer (ideally 20 m but could be less depending on circumstance) around all riparian areas, wetlands, springs, and mature tree stands to protect the ecological values that these areas offer. Since riparian areas, wetlands, and mature forested areas often offer excellent wildlife viewing opportunities, it is possible to provide low-impact access to these areas (e.g., off-ground boardwalks and platforms, and narrow trails) as a way to increase the social value of these areas and increase the overall quality of life in the Village.

Although the aquatic habitat may have limited capability to support all life stages of fish, reducing the amount of nearshore disturbances could increase potential for spawning and foraging habitat for small-bodied fish, which prefer vegetated areas. Generally, if the Village would like to improve fish and wildlife habitat, riparian, aquatic, and forested habitats that are impaired should be targeted for restoration and healthy areas should be targeted for protection and conservation. Additionally, strategies to reduce nutrient, sediment and contaminant inputs into the lake should be implemented, and the Village should promote low-impact development as the community continues to grow.

9. References

Alberta Environment and Sustainable Resource Development (ESRD). 2015. Alberta Wetland Classification System. Water Policy Branch, Alberta Environment and Parks. Edmonton, AB.

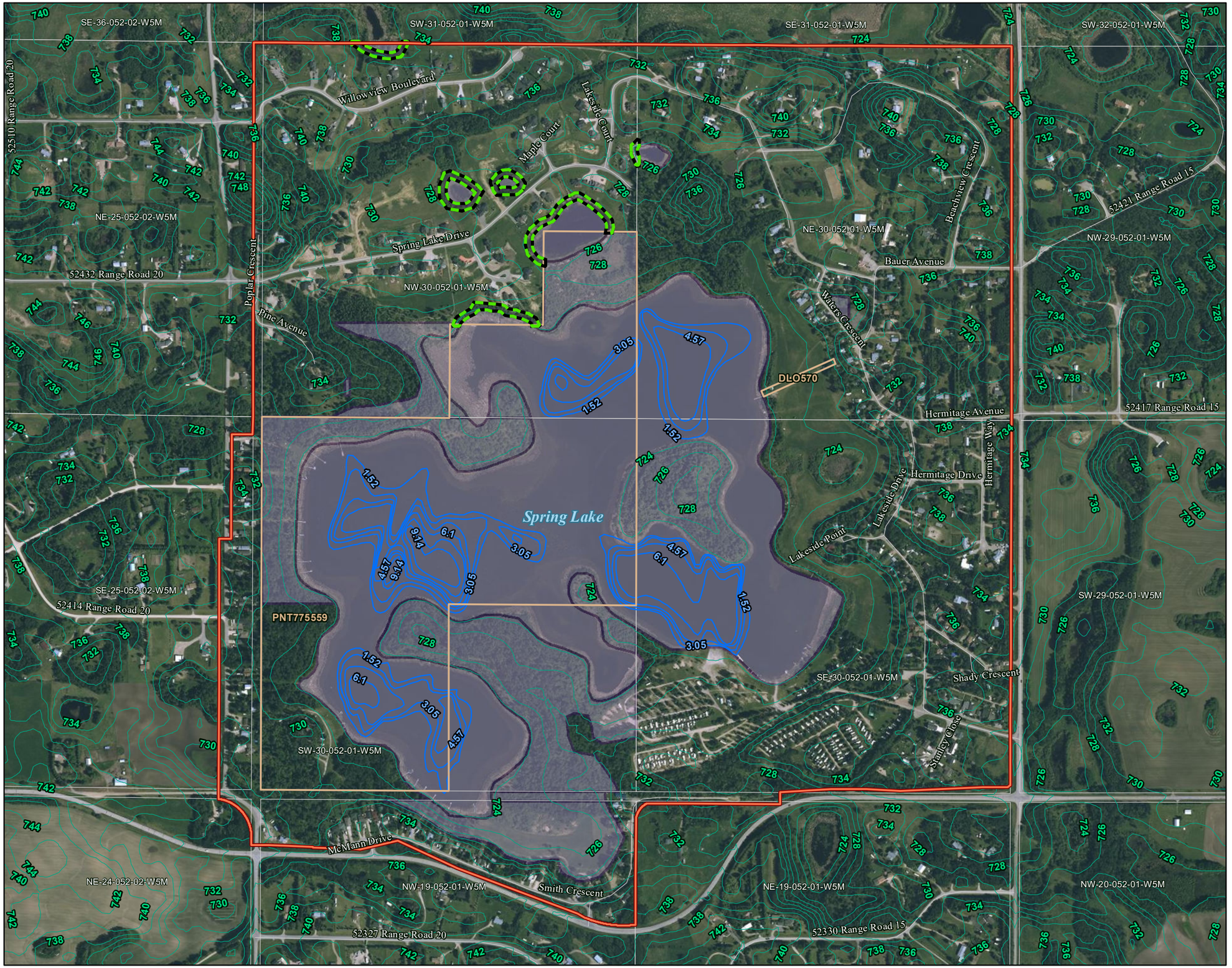
Beckingham, J. D., and Archibald, J. H. 1996. Field Guide to Ecosites of Northern Alberta. UBC Press, Vancouver, BC.

Fiera Biological Consulting. 2018. Sturgeon Watershed and Riparian Assessment – Final Report. Prepared for the North Saskatchewan Watershed Alliance. Available from: https://www.nswa.ab.ca/wp-content/uploads/2019/01/Sturgeon_Riparian-Assessment_Report-Fiera-June-2018-FINAL.pdf

University of Alberta. 1990. Atlas of Alberta Lakes: Spring Lake. Available from: http://albertalakes.ualberta.ca/?page=lake&lake=87&region=3

10. Appendices

Appendix 1: Overview Map

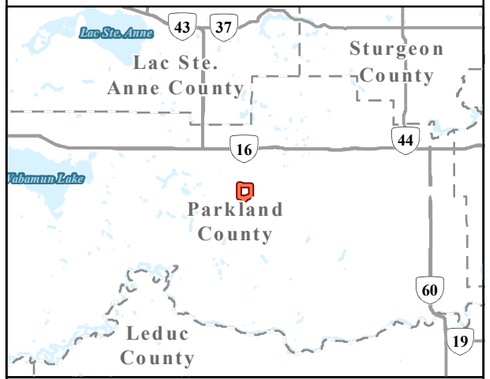


MUNICIPAL PLANNING SERVICES

Spring Lake Biophysical Survey

Figure 1: Overview

- Bathymetry (m)
- Contour Line (2 m)
- Spring Lake Summer Village
- Crown Land
- Environmental Reserve
- Disposition
- Legal Land Description



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LiDAR Acquisition Date: Jan 15, 2017
Coordinate System: NAD 1983 3TM 114

N W E S

1:8,000

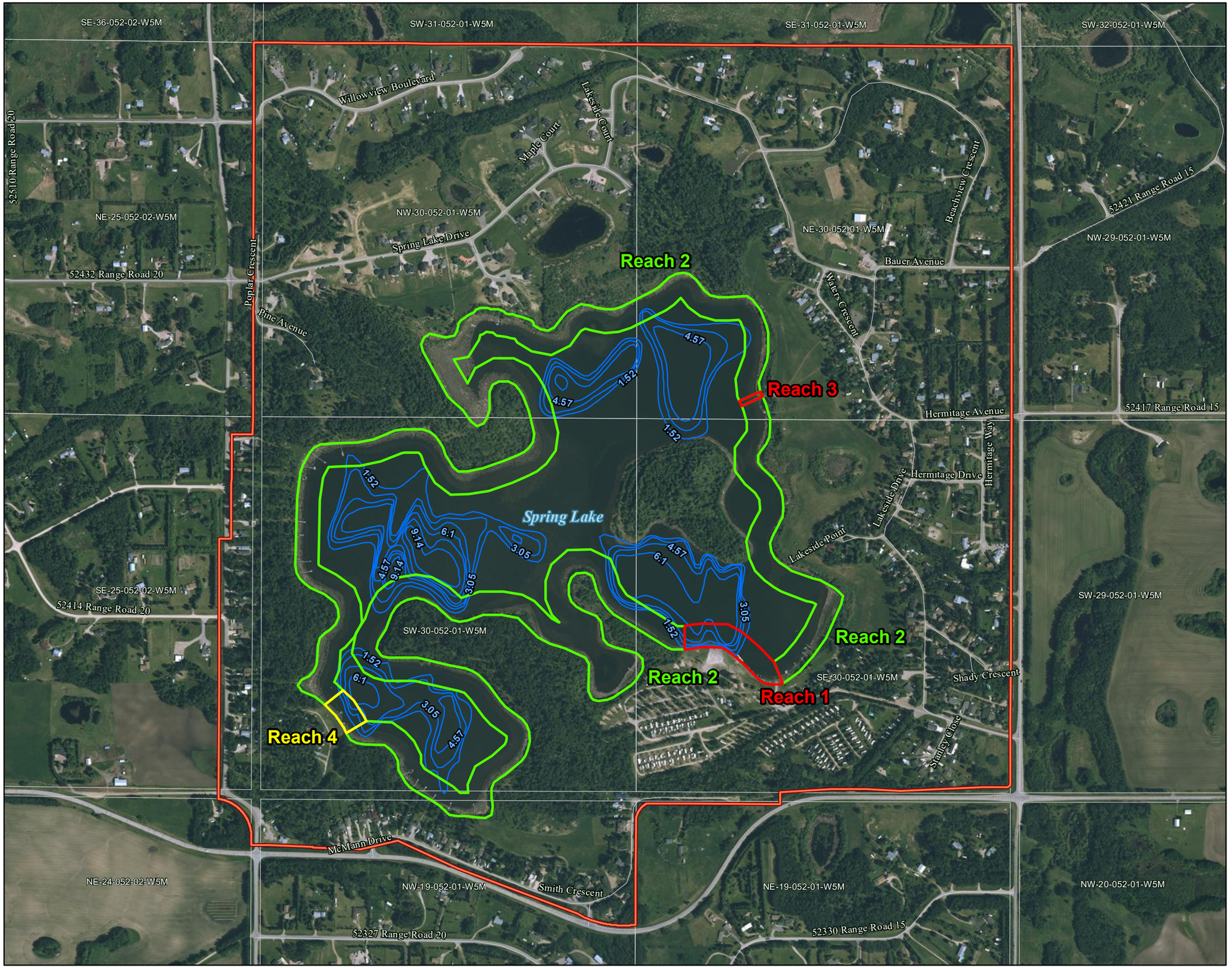
0 100 200 300 400 m

Date: July 22, 2020

Prepared by: R. Ok

CPP ENVIRONMENTAL

Appendix 2: Aquatic Environmental Assessment Map



MUNICIPAL PLANNING SERVICES

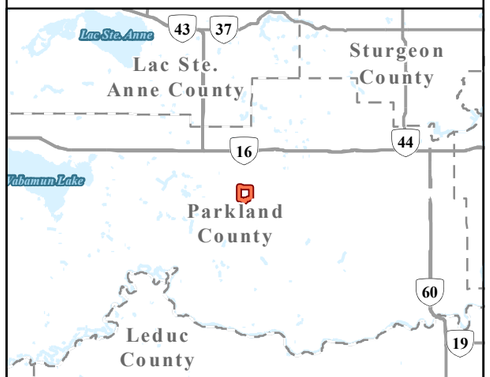
Spring Lake Biophysical Survey

Figure 2: Aquatic Environmental Assessment

- Bathymetry (m)
- Spring Lake Summer Village

Aquatic Assessment

- High Disturbance
- Moderate Disturbance
- Natural / Low Disturbance
- Legal Land Description



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Coordinate System: NAD 1983 3TM 114

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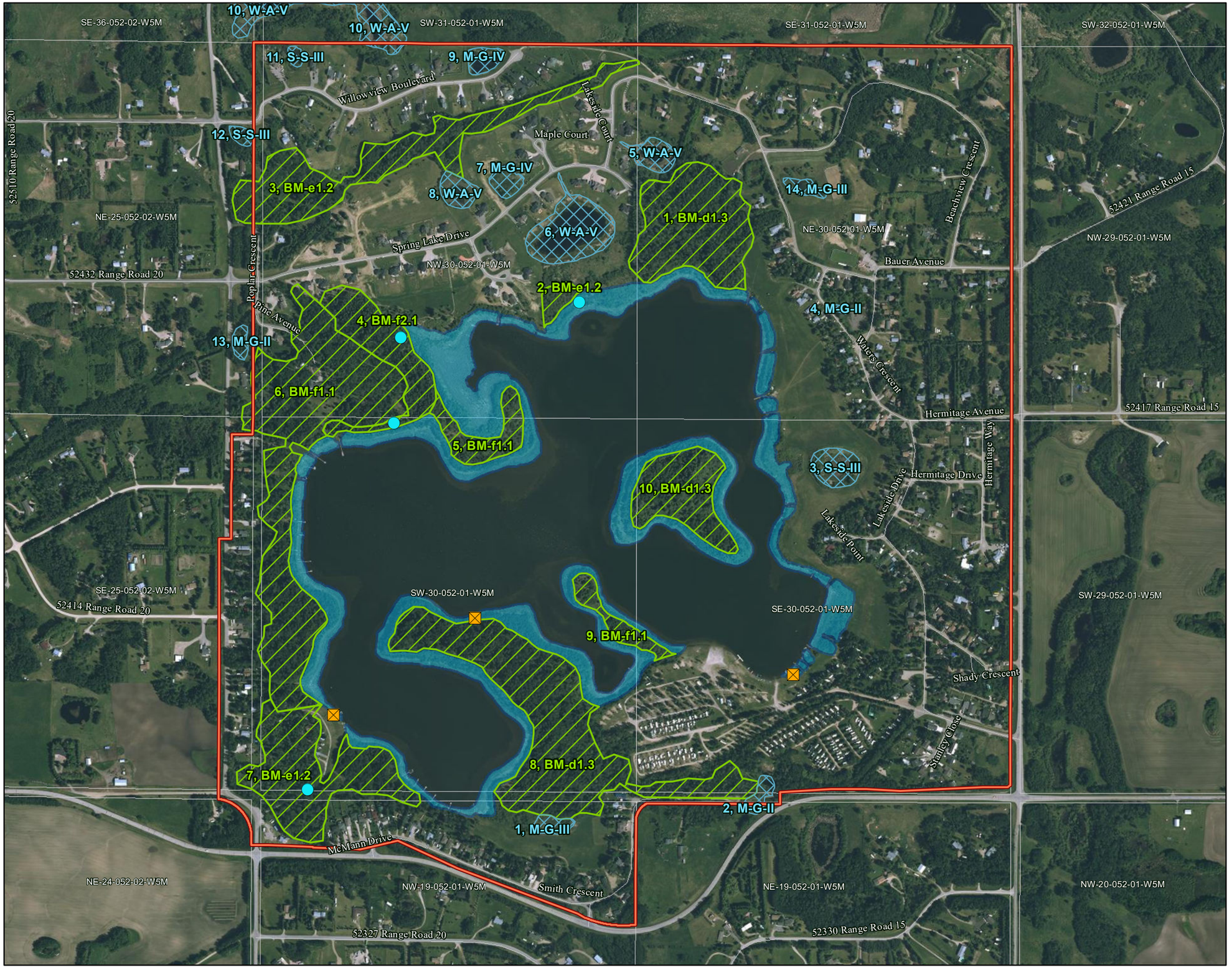
0 100 200 300 400 m

Date: July 22, 2020

Prepared by: R. Ok

CPP ENVIRONMENTAL

Appendix 3: Sensitive Environmental Features Map

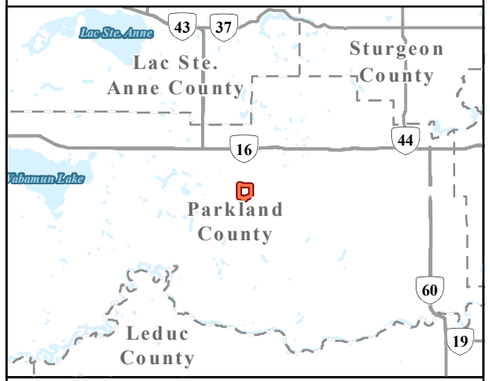


MUNICIPAL PLANNING SERVICES

Spring Lake Biophysical Survey

Figure 3: Sensitive Environmental Features

- Orange Hawkweed Observation (3)
- Springs (4)
- Spring Lake Summer Village
- Riparian Areas
- Terrestrial Habitats (ID, Ecosite)
- Wetlands (ID, AWCS)
- Legal Land Description



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LiDAR Acquisition Date: Jan 15, 2017
Coordinate System: NAD 1983 3TM 114

N W E S

1:8,000

0 100 200 300 400 m

Date: July 22, 2020

Prepared by: R. Ok

CPP ENVIRONMENTAL

Appendix 4: Site Photographs

Photo 1: Reach 1 – View looking SE from most western edge of reach. Transition zone from emergent

Photo 2: Reach 1 – View of western side of reach, including beach and RV resort.

Photo 3: Reach 1 – Boat launch for RV resort. Most eastern edge of reach 1. Reach 2 shown in right of photo.

Photo 4: Reach 1 – Beach, park area and swimming zone pictured within reach.

Photo 5: Reach 1 – View of beach, park, and RV resort.

Photo 6: Reach 1 – Shoreline along reach.

Photo 7: Reach 1 – View of beach and park area from swimming zone.

Photo 8: Reach 1 – Substrate and aquatic vegetation within swimming zone. Aquatic vegetation located on outside of swimming zone.

Photo 9: Reach 1 – Boats tied to shoreline.

Photo 10: Reach 2 – Emergent vegetation intact, except for dock. Floating rafts tied to shoreline and within emergent vegetation.

Photo 11: Reach 2 – Lake access from properties. The extent of disturbance shown in this photo was typical of reach 2.

Photo 12: Reach 2 – Majority of reach remained undisturbed. Emergent vegetation and riparian area intact.

Photo 13: Reach 2 – Typical shoreline development.

Photo 14: Reach 2 – Typical transitional vegetation from lake shore to upland.

Photo 15: Reach 2 – View of Spring Lake Ranch from lake.

Photo 16: Reach 2 – View of emergent vegetation along eastern shore.

Photo 17: Reach 2 – Typical shoreline development, docks, small boats, and rafts.

Photo 18: Reach 2 - Typical shoreline development, docks, small boats, and rafts

Photo 19: Reach 2 – View of undisturbed emergent vegetation and riparian area.

Photo 20: Reach 2 – Typical aquatic vegetation found within reach from the edge of emergent vegetation until water depth is too deep to visually confirm aquatic vegetation.

Photo 21: Reach 3 – Access to waters edge. Many non-motorized boats stored within treeline.

Photo 22: Reach 3 – Access to waters edge on private property. Spring Lake has a posted speed limit for watercraft.

Photo 25: Reach 3 – Substrate type and limited aquatic vegetation within 5 m of shoreline.

Photo 26: Reach 3 – Floating dock associated with boat launch.

Photo 27: Reach 4 – Beach resort located on SW side of lake. Riparian shrubs removed.

Photo 28: Reach 4 – Emergent vegetation intact. One section (approximately 2 m) removed for lake access. Boats tied to shoreline.

Photo 29: Unknown minnow species (*Cyprinidae* spp.) found near shoreline in Reach 1.

Photo 30: Wetland 1 (M-G-III) – Wet meadow found along the southern end of the summer village.

Photo 31: Wetland 1 (M-G-III) – Wet meadow found along the southern end of the summer village.

Photo 33: Wetland 2 (M-G-II) – Depression in the landscape with some standing water. Two sections of wetland separated by walking trail.

Photo 34: Wetland 2 (M-G-II) – Depression in the landscape with some standing water. Two sections of wetland separated by walking trail.

Photo 35: Wetland 3 (S-S-III) – Vegetation surrounding seasonal wetland.

Photo 36: Wetland 4 (M-G-II) – Depression in area between road and houses. Standing water visible in wetland.

Photo 37: Wetland 4 (M-G-II) – Depression in area between road and houses. Standing water visible in wetland.

Photo 38: Wetland 5 (W-A-V) – Area surrounding wetland intact. Vegetation is thick. Red-winged black birds utilizing wetland habitat.

Photo 39: Wetland 5 (W-A-V) – View "upstream" of wetland drainage path into wetland.

Photo 40: Wetland 5 (W-A-V) – Drainage path from ditches into wetland 5. Rock check dams present.

Photo 41: Wetland 5 (W-A-V) – Ditch drainage from subdivision into wetland 5.

Photo 42: Wetland 5 (W-A-V) – View of drainage path between yards and convergence of ditch drainage paths.

Photo 43: Wetland 6 (W-A-V) – View of largest ponded wetland. Properties back on to approximately 60% of the wetland.

Photo 44: Wetland 6 (W-A-V) – View of largest ponded wetland. Properties back on to approximately 60% of the wetland.

Photo 45: Wetland 6 (W-A-V) – View of mowed areas along edge of Environmental Reserve.

Photo 46: Wetland 6 (W-A-V) – View of typical backyard appearance towards the edge of Environmental Reserve.

Photo 47: Wetland 7 (M-G-IV) – Open water visible in channel-like appearance. Wetland 7 and 8 may have been connected before road development.

Photo 48: Wetland 7 (M-G-IV) – Wetland surrounded by large willows on two sides. Wetland 7 and 8 may have been connected before road development.

Photo 49: Wetland 8 (W-A-V) – Water surface mostly covered in duckweed (*Lemna minor*). Surrounded by willows almost the entire perimeter.

Photo 50: Wetland 9 (M-G-IV) – Wetland along road along northern boundary of summer village.

Photo 51: Wetland 11 (S-S-III) – Wetland found fenced on a private residence.

Photo 52: Wetland 12 (S-S-III) – Steep slopes in area. Depressional low spot within large hills. Surrounded by large balsam poplar, upslope, and willows.

Photo 53: Wetland 13 (M-G-II) – Area located along Range Road 20. Large balsam poplar with thick understory.

Photo 54: Wetland 13 (M-G-II) – Area located along Range Road 20.

Riparian Areas

Photo 55: Typical vegetation of paper birch and willows (*Betula papyifera* and *Salix* spp.) found within SE riparian areas.

Photo 56: Typical vegetation of willows and paper birch (*Salix* spp and *Populus balsamifera*) found within SE riparian areas.

Photo 57: Typical vegetation of willows (*Salix* spp) found within SE riparian areas. Wildlife path visible.

Photo 58: Open area with a stand of young balsam poplar (*Populus balsamifera)*. Area located near the northern shore.

Photo 59: Dominant willow (*Salix spp*.) present near open area along northern shore.

Photo 60: Typical riparian scene found along the lake side.

Photo 61: Typical riparian scene found along the lake side.

Photo 62: Typical riparian vegetation of paper birch, balsam poplar, horsetails and willows (*Betula papyifera*, *Populus balsamifera*, *Equisetum* spp, and *Salix spp*.) found along riparian area.

Photo 63: Understory vegetation found within riparian areas with larger deciduous trees promoting cover.

Photo 64: Horsetails (*Equisetum* spp) found within riparian area along northern shore.

Photo 65: Riparian vegetation along NW shore.

Photo 66: Riparian area along NW shore, slightly upland. Raspberry (*Rubus idaeus)* is the dominant shrub.

Photo 67: Vegetation along the bay of the NW shoreline.

Photo 68: Riparian vegetation along east side of lake. Paper birch (*Betula papyifera)* is the dominant tree.

Photo 69: Riparian vegetation along larger southern peninsula. Young paper birch stand.

Photo 70: Riparian vegetation on east end of secondary peninsula on the southern shore.

Wildlife Observations

Photo 71: Canine scat found within riparian area, east side.

Photo 72: Beaver activity found within riparian area near Spring Lake RV Resort.

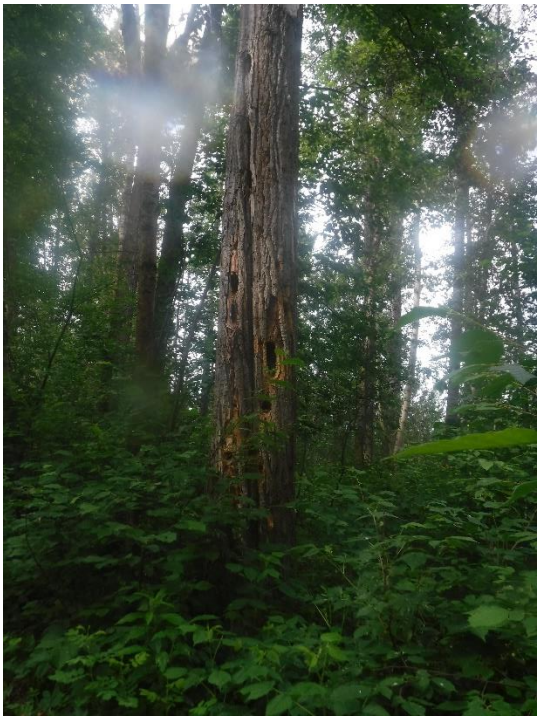


Photo 73: Woodpecker activity on standing snag.

Photo 74: Woodpecker activity on standing snag.

Springs

Photo 75: Spring 1 – Found along the northern shoreline.

Photo 76: Spring 2 – Found inland along NW shoreline.

Photo 77: Spring 3 – Found along NW shoreline.

Terrestrial Ecosites

Photo 78: Typical vegetation of ecosite classification BM-d1.3.

Photo 79: Typical vegetation of ecosite classification BM-e1.2.

Photo 80: Typical vegetation of ecosite classification BM-f1.1.

Photo 81: Typical vegetation of ecosite classification BM-f2.1.

Other Notable Observations

Photo 82: One of multiple signs for loons in the area.

Photo 83: Soil exposed by technician within the SE riparian area.

Photo 84: Signage at entrance to boat launch for Edmonton Trout Fishing Club, indicating watercraft speed limit for Spring Lake.

Photo 85: Bulletin board at DLO access for Edmonton Trout Fishing Club with information about Report a Poacher and Clean, Drain, Dry campaigns.

Photo 86: Pallet found near spring. Pallet is used to walk across wet area.

Photo 87: Northern Green Bog-Orchid (*Habenaria hyperborea*) found in multiple locations in moist forests near the lake shore.

Photo 88: Swale created to drain spring water off property towards lake.

Photo 89: Slash pile containing some domestic infrastructure pushed into treeline.

Photo 90: Orange Hawkweed (*Hieracium aurantiacum)*, a Prohibited Noxious weed, observed along the shore of Spring Lake.

Photo 91: Green-Flowered Wintergreen (*Pyrola virens*) found in moist forests near the lake shore.

Photo 92: Spring Lake Ranch subdivision development sales board near Wetland 7 & 8.

Photo 93: Boardwalk installed across wet area to continue walking path. Signage provides information about path usage and horses.

Photo 94: Park bench found along walking trail in NW area of the lake.

Photo 95: Walking trail signage.

Photo 96: Canada Goose deterrent device. Found on RV Resort beach area.

Appendix 5: ACIMS Search Results

Date: 1/5/2020
Requestor: Consultant
Reason for Request: Environmental Assessment
SEC: -- **TWP:** 052 **RGE:** 01 **MER:** 5

Alberta Parks

Non-sensitive EOs (updated: October 2017)

M_RR_TTT_SS	EO_ID	ECODE	S_RANK	SNAME	SCOMNAME	LAST_OBS_D

No Non-sensitive EOs Found: Next Steps - See FAQ (https://www.albertaparks.ca/albertaparksca/management-land-use/alberta-conservation-information-management-system-acims/faqs.aspx#2 - Process)

Sensitive EOs (updated: October 2017)

M-RR-TTT	EO_ID	ECODE	S_RANK	SNAME	SCOMNAME	LAST_OBS_D

No Sensitive EOs Found: Next Steps - See FAQ (https://www.albertaparks.ca/albertaparksca/management-land-use/alberta-conservation-information-management-system-acims/faqs.aspx#2 - Process)

Protected Areas (updated: October 2017)

M-RR-TTT-SS	PROTECTED_AREA_NAME	TYPE	IUCN

No Protected Areas Found

Crown Reservations/Notations (updated: October 2017)

M-RR-TTT-SS	NAME	TYPE

No Crown Reservations/Notations Found

Appendix 6: FWIMT Search Results

Fish and Wildlife Internet Mapping Tool (FWIMT)

(source database: Fish and Wildlife Management Information System (FWMIS))

Species Summary Report

Report Date: 01-May-2020 11:01

Species present within the current extent

Fish Inventory	Wildlife Inventory	Stocked Inventory
BROOK STICKLEBACK	No Species Found in Search Extent	BROOK TROUT
FATHEAD MINNOW		RAINBOW TROUT
MINNOW FAMILY		
NORTHERN CRAYFISH		
NORTHERN PIKE		
RAINBOW TROUT		
YELLOW PERCH		

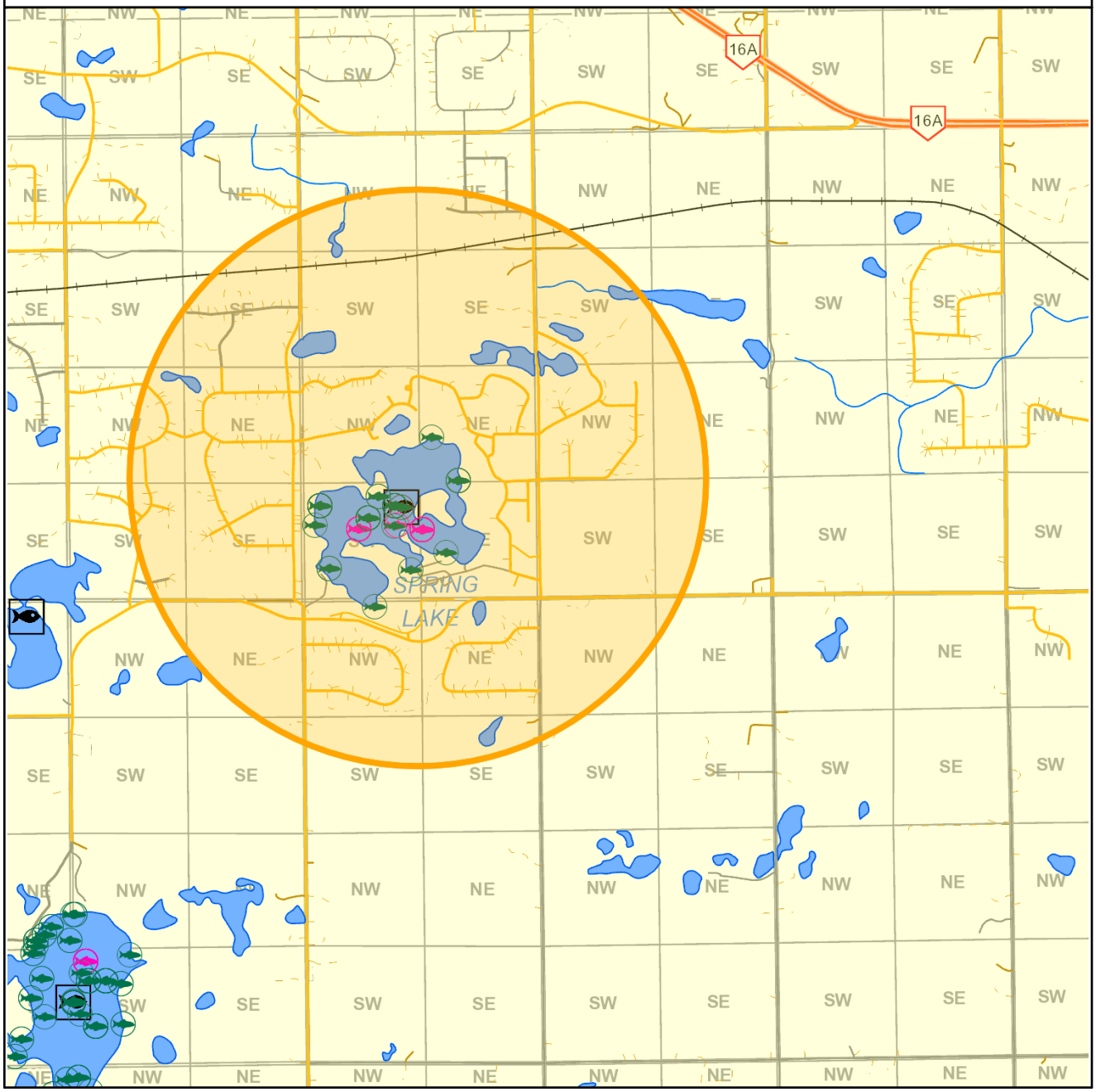
Buffer Extent

Centroid (X,Y)	Projection	Centroid (Qtr Sec Twp Rng Mer)	Radius or Dimensions
557191, 5928056	10-TM AEP Forest	NW 30 52 1 5	2 kilometers

Contact Information

For contact information, please visit:
https://www.alberta.ca/fisheries-and-wildlife-management-contacts.aspx

01-May-2020 11:01 **Map Results**



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Appendix 7: LAT Report

Landscape Analysis Tool (LAT) Report

LAT Number:	000005A19B	**LAT Date:** 2020-05-01	11:08:18
Project Name:			
Project Description:			
Disposition Type:	DLO	Licence of Occupation	
Purpose Type:	RCTR	Research, Monitoring and Education	
Activity Type:	RCTR02DLOP	Education/Research Activity (M/NP)	

Responsibility of Applicants:

It is the applicant's responsibility to conduct a full review of the generated LAT Report, ensuring that you are aware and have a full understanding of the identified standards and conditions, and any additional limitations that may also be imposed by an approved higher level plan, reservation or notation or any other law or Order of the Province or the Government of Canada that may impact the placement, construction or operation of the proposed disposition, purpose and activity.

The applicant must assess if the proposed disposition, purpose and activity can meet the applicable standards, conditions and any limitations which will subsequently determine if the application can be submitted to the regulatory body. Applicants should complete a thorough review of regulatory and application processes including supporting procedural documents and the generated LAT Reports prior to making this determination.

Where the applicant chooses not to meet, or is not able to meet, one or more Approval Standards or higher level plans within the generated LAT Report as submitted as part of the application, or any affected reservations as identified within the land status report, the applicant is required to complete the appropriate mitigation as part of their supplement submission that addresses individually each of the items not being met.

The information provided within the LAT Tool is a spatial representation of features provided to the applicant for activity and land use planning. The accuracy of these layers varies depending on the resource value being represented. The regulatory body insists that site visits, wildlife surveys and groundtruthing efforts are completed to ensure that you, the applicant can meet the procedures detailed within the *Pre-Application Requirements for Formal Dispositions*, the identified approval standards, operating conditions and *Best Management Practices* as represented within the *Master Schedule of Standards and Conditions*.

Proximity to Watercourse/Waterbodies:

Applicants will ensure that standards or conditions for Watercourse/Waterbody features as identified within the generated LAT Report are followed. It is the responsibility of the applicant to ensure the identified setbacks and buffers are properly established through a pre-site assessment and maintained.

NOTE: Be aware that the submission of a LAT Report as part of an application submission does not imply approval of the activity. The standards and conditions identified within the LAT Report may be subject to change based on regulatory review.

Base Features

Green/White Area	White Area
Municipality	Parkland County
FMA	
FMU	WO2
Provincial Grazing Reserve	
Rocky Mountain Forest Reserve	
PLUZ Areas	
Protected Areas	

Provincial Sanctuaries

Wildlife Corridors	
Restricted Area	
Game Bird	Zone 4
Seasonal	

Higher Level Plans

Integrated Resource Plan (Local)	
Integrated Resource Plan (Subregional)	
Access Management Plan	
Landscape Management Plan	

Additional Application Requirements

Wildlife Survey		DND Area	

Historical Resources

HRV Rating	Category

Historic Resources Application Required: No

While no specific historic resource concerns have been identified within the proposed activity area, Section 31 of the *Historical Resources Act* states that "a person who discovers a historic resource in the course of making an excavation for a purpose other than for the purpose of seeking historic resources shall forthwith notify the Minister of the discovery." Should a historic resource be encountered with the construction or operation of this disposition, information on who to contact can be found on the Ministry of Culture and Tourism's website in; Standard Requirements under the Historical Resources Act: Reporting the Discovery of Historic Resources.

Sensitive Features

Wildlife and Other Sensitive Species

	Intersected		Intersected
Burrowing Owl Range		Ord's Kangaroo Rat Key Habitat Area	
Caribou Range		Other Sensitive and Endangered Species	
Colonial Nesting Birds			
Endangered and Threatened Plants Ranges		Piping Plover Waterbodies	
		Sensitive Amphibian Ranges	
Federal Aquatic Critical Habitat		Sensitive Raptor Range	
Greater Short-horned Lizard Habitat		Sensitive Snake Species Range	
Greater Short-horned Lizard Range		Sharp-tailed Grouse Leks and Buffer	
Greater Sage Grouse Range		Sharp-tailed Grouse Survey	
Greater Sage Grouse Leks and Buffer		Special Access Area	
Grizzly Bear Zone		Swift Fox Range	
Key Wildlife and Biodiversity Areas		Trumpeter Swan Buffer	
Mountain Goat and Sheep Areas		Trumpeter Swan Waterbodies/Watercourse	
Ord's Kangaroo Rat Range			

Federal Orders:

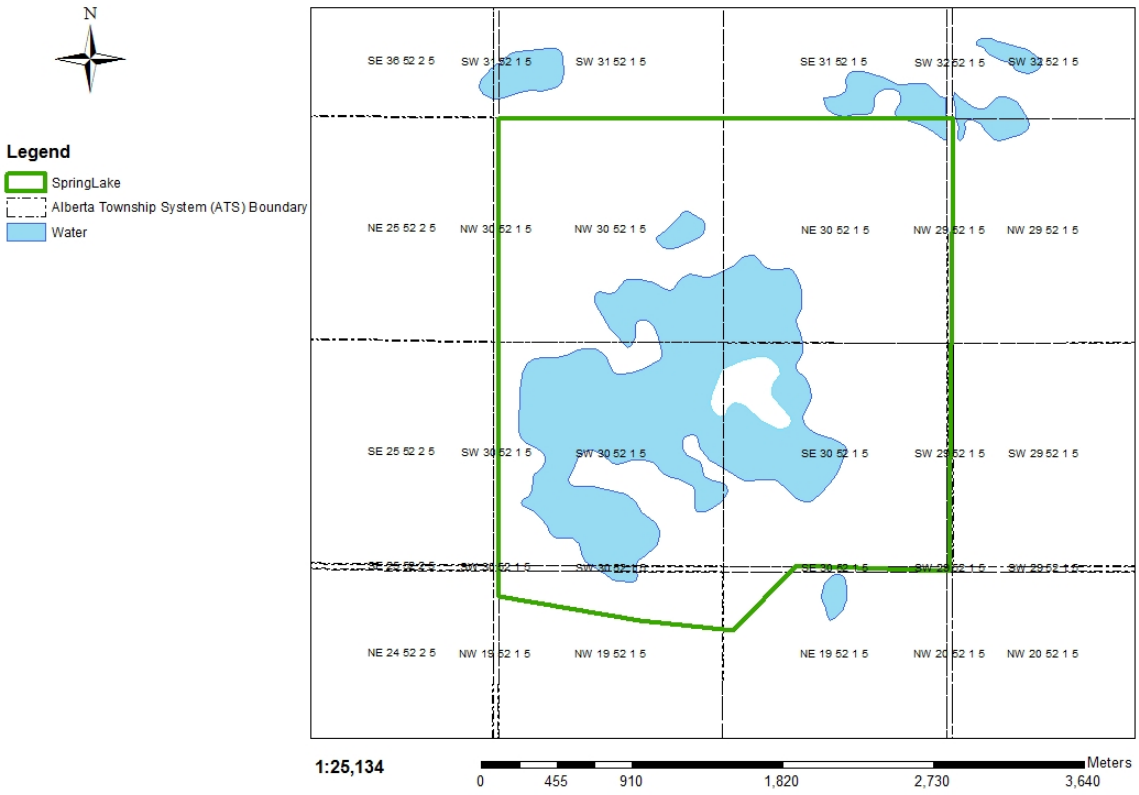
	Intersected
Greater Sage Grouse	

Grassland and Natural Regions:

	Intersected		Intersected
Central Parkland		Mixed Grass Sub-region layer	
Central Parkland and Northern Fescue		Montane	
Chinook Grasslands		Northern Fescue	
Dry Mixed Grass		Peace River Parkland	
Foothills Fescue		Permafrost	
Foothills Parkland Grasslands		Rough Fescue PNT	
Grassland and Parkland Natural Region		Subalpine or Alpine	

Alberta Township System (ATS) Land List

Quarter	Section	Township	Range	Meridian	Road Allow.	Sensitive Features Identified
NW	19	52	1	5	RW	Green / White Area
SW	30	52	1	5	RI	Green / White Area
NW	29	52	1	5	RW	Green / White Area
SE	30	52	1	5		Green / White Area
NW	19	52	1	5		Green / White Area
NW	30	52	1	5		Green / White Area
SW	32	52	1	5		Green / White Area
NW	30	52	1	5	RW	Green / White Area
SE	31	52	1	5		Green / White Area
SW	29	52	1	5	RW	Green / White Area
SW	29	52	1	5	RI	Green / White Area
SE	30	52	1	5	RS	Green / White Area
SW	32	52	1	5	RW	Green / White Area
NW	29	52	1	5		Green / White Area
SW	30	52	1	5		Green / White Area
SW	30	52	1	5	RS	Green / White Area
NE	19	52	1	5		Green / White Area
SW	30	52	1	5	RW	Green / White Area
NE	30	52	1	5		Green / White Area


N
Legend
SpringLake
Alberta Township System (ATS) Boundary
Water
SE 36 52 2 5
SW 31 52 1 5
SW 31 52 1 5
SE 31 52 1 5
SW 32 52 1 5
SW 32 52 1 5
NE 25 52 2 5
NW 30 52 1 5
NW 30 52 1 5
NE 30 52 1 5
NW 29 52 1 5
NW 29 52 1 5
SE 25 52 2 5
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SE 30 52 1 5
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NE 24 52 2 5
NW 19 52 1 5
NW 19 52 1 5
NE 19 52 1 5
NW 20 52 1 5
NW 20 52 1 5
1:25,134
0
455
910
1,820
2,730
3,640
Meters

Appendix 8: Orange Hawkweed Fact Sheet

ALBERTA invasive species COUNCIL
abinvasives.ca
info@abinvasives.ca

Last Updated July 2015

Orange Hawkweed

Hieracium aurantiacum

Alberta Regulation: Weed Act

Overview:

Orange hawkweed is a member of the Aster Family native to Europe. It is a fibrous rooted, perennial herb with a milky latex in the stems and leaves. Hawkweeds reproduce by seeds and vegetatively by numerous horizontal stolons, and rhizomes underground.[2] Seeds are produced by apomixis - asexually - as non-native hawkweeds are polyploids (n=9), as opposed to the native diploid hawkweeds.[1] Occasional sexual reproduction occurs.[1]

Hawkweeds develop a low rosette of basal leaves before producing a flowering stem. Dandelion-like flowers are borne at the ends of stems. Orange hawkweed is unique among both native and introduced hawkweeds in that flowers are a fiery orange colour. All other hawkweed are yellow flowered and there is one white flowered species.

Non-native hawkweeds exhibit many characteristics of an invasive plant: high seed production and germination rates, asexual seed production, wind-dispersed seed, vegetative reproduction via rhizomes, stolons, and root fragments, and rapid growth.[1] A few invasive hawkweed species are popular ornamentals. All of these characteristics facilitate rapid colonization and monopolizing of resources. An undetected patch of hawkweed has great potential to become an uneradicable infestation.

Habitat:

Hawkweeds prefer well drained, coarse textured soils, moderately low in organic matter, in mesic habitats.[1] It can successfully grow under coniferous forest canopy.

Identification:

Stems: Are erect, usually solitary, and leafless or with leaves or with just 1 or 2 greatly reduced leaves.[2] Stems bear numerous stellate, glandular, and simple hairs. Plants grow 10-60 cm.[1] Stolons are present and hairy.[2]

Leaves: Basal leaves are oblong/lance-shaped to elliptic, and narrow to a petiole, and 4-20 cm long 1-3.5 cm wide. The upper leaf surfaces bear numerous simple hairs and the lower surfaces bear both simple and stellate hairs. Leaf margins may be entire or slightly toothed.[2]

Flowers: Red-orange ray flowers are borne in open, rounded clusters of 20-50.[1] Involucral bracts are lance-shaped, 5-8 mm tall[2], with numerous stellate, blackish glandular, and simple hairs.[1] Achenes are narrowed at the base, 1.5-2 mm long, with a brownish pappus.[2]

Prevention:

Learning to recognize hawkweeds from the many yellow-flowered members of the Aster Family is key to prevention. Hairs are an important characteristic of non-native hawkweeds and also in distinguishing between species. Stolons facilitate rapid colonization of a patch of ground. Long term management of hawkweeds requires maintaining healthy forbs and grasses - fertilization of desirable vegetation can result in out-competition of hawkweeds. Re-seed disturbance in areas susceptible to hawkweed invasion.

Control:

continued next page

ALBERTA invasive species COUNCIL
abinvasives.ca
info@abinvasives.ca

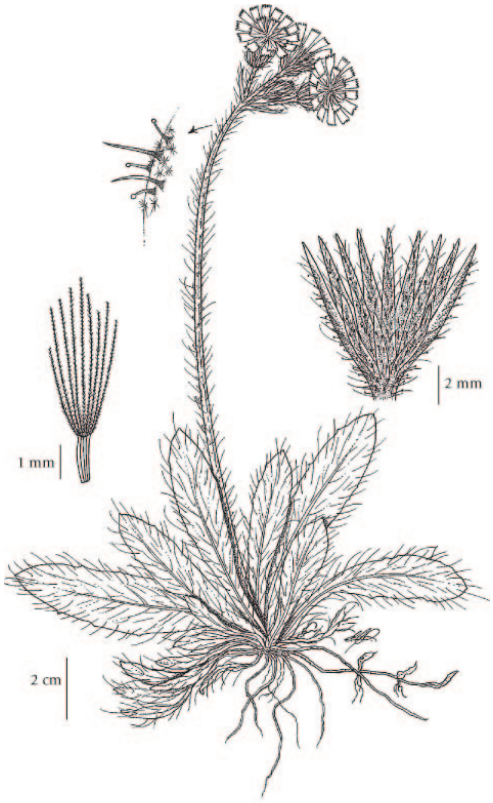
Orange Hawkweed (Continued)

Grazing: Unknown. Invasive plants should never be considered as forage.

Mechanical: Mowing before flowering will prevent seed production of taller plants but will not inhibit reproduction via stolons and rhizomes. Hand digging of small infestations where all stolons and root can be removed may be effective. Root fragments can generate new plants, therefore any mechanical tilling/cultivation would be ineffective.

Chemical: Hexazinone, 2,4-D, and glyphosate are registered for use on *Hieracium* spp./hawkweeds. Always check product labels to ensure the herbicide is registered for use on the target plant in Canada by the Pesticide Management Regulatory Agency. Consult your local Agricultural Fieldman or Certified Pesticide Dispenser for more information.

Biological: The stolon-tip gall wasp *Aulacidea subterminalis* was first released in BC in 2011. Results are pending.[3]



Leaf & Stem

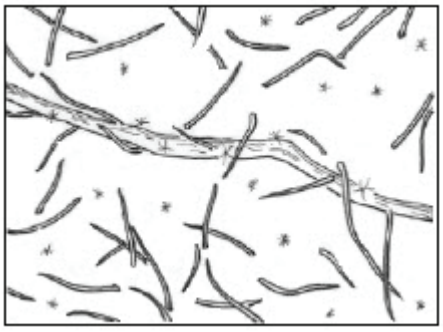
Leaves

Seeds

Alberta Sustainable Resource Development

Seed head

Seeds



C Roche

Stem

REFERENCES

1 Wilson, Linda. Key to Identification of Invasive and Native Hawkweeds in the Pacific Northwest. British Columbia Ministry of Forests and Range, Forest Practices Branch, Invasive Alien Plant Program.

2 Hieracium aurantiacum. Electronic Atlas of the Flora of British Columbia. http://ibis.geog.ubc.ca/biodiversity/eflora/Accessed October 26, 2014.

3 Target Invasive Plants and Biocontrol Agents Undergoing Screening. BC Ministry of Forests, Lands and Natural Resource Operations. http://www.for.gov.bc.ca/hra/plants/biocontrol/screenagents.htm#Hawkweedcomplex. Accessed June 10, 2014.

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