Yukon Stocked Lake Program: Potential Lake Identification Project 2017

Prepared For
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Down to Earth Biology

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PREAMBLE

This project identifies waterbodies which may be suitable candidates for inclusion in the Yukon stocked lakes program. A spatial database that shows all waterbodies that were selected by the mapping exercise accompanies this report.

The scope of the project did not include fieldwork, extensive research on existing fish presence of existing fish presence and as such the following is relevant:

- The lakes identified may have existing fish populations.
- Habitat conditions and confirmation of connectivity to other streams is requirement to confirm the overall suitability as stocked lakes.
- The ranking system involved selection of parameters that influenced the selection of lakes. For example, lakes were removed if they were greater than 2 km from road access or if they were adjacent to First Nation Settlement lands.

EXECUTIVE SUMMARY

The Yukon Stocked Lakes Program currently contains 20 pothole lakes across the territory which are stocked with various fish species including rainbow trout, kokanee salmon and Arctic char. The rationale for the program is to be provide angling opportunities for fish species non typically found in the Yukon and to help alleviate angling pressure on stocks of native fish species including lake trout. This report summarizes the results of a desktop exercise to identification potential candidate lakes for further investigation to facilitate the expansion of the Yukon Stocked Lakes Program. This project arose due to the interest in the expansion of the Program stemming partially from conservation concerns and angling restrictions for some native fish stocks in the Yukon. A variety of available spatial information was used to identify a set of potential waterbodies within 2 km of roadways throughout the territory. A number of other parameters were derived from each of these waterbodies including waterbody size, distance from communities, and distance from existing access (roads and trails). This information was then used to develop a ranking system were the top candidate lakes in each of Environment Yukon's management area were identification. A number of candidate lakes were identified for additional investigation (by Environment Yukon) to set the stage for the potential future expansion of the Yukon Stocked Lakes Program.

ACKNOWLEDGEMENTS

Oliver Barker and Aaron Foos of Environment Yukon provided information on existing assessments to potential candidate lakes, provided direction on the overall project and reviewed the preliminary results of this project. Funding for this project was provided by the Yukon Fish and Wildlife Enhancement Trust Fund.

AUTHORSHIP

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1 INTRODUCTION

Over the past 30 years, Environment Yukon has worked with the Yukon Fish and Game Association to maintain a network of stocked 'pothole'[1] lakes throughout much of the Yukon and have released hundreds of thousands of fish into a number of these lakes. The intent of the Yukon stocked lakes program is to provide accessible angling opportunities for the public and in many cases, provide the opportunity to catch fish species not widely distributed in the Yukon. The current stocked lakes not only offer angling opportunities for species such as rainbow trout, Arctic char and kokanee salmon, but also are intended to offset some angling pressure from native fish stocks in the Yukon including lake trout and Arctic grayling.

The purpose of the proposed project was to conduct a desktop GIS analysis to identify new candidate lakes for the Yukon stocked lakes program. There are currently 20 actively stocked lakes within the Yukon stocked lakes program and there are interests from numerous groups and individuals to increase the number of lakes in the program. The need to provide new angling opportunities has become a more pressing concern in recent years due to conservation concerns for some native fish stocks in the territory. For example, the recent fishing regulation changes for a number of lake trout populations on smaller, more accessible lakes has further emphasized the importance of the Yukon stocked lakes program. This project involved working with Environment Yukon given their responsibility to manage the stocked lakes program. It is important to note that Environment Yukon has not committed to the expansion of the stocked lakes program based upon the outcome of this project. This report is intended to provide Environment Yukon with information to consider. If there is interest in any of the identified lakes, additional tasks to determine of stocking of the identified candidate lakes will be required.

The specific objectives of this project were to:

- Identify and characterize potential candidate lakes throughout the Yukon using available GIS data, and,
- Develop a ranking system to highlight potential candidate lakes within each of Environment Yukon's management regions that meet specific desirable criteria (i.e. waterbody size, distance from communities and access).

[1] Pothole lakes in this context specifically refers to lakes that are in closed systems and not connected to other waterbodies where stocked fish can escape and may provide a threat to native populations of fish.

2 METHODS

At the outset of the project, we recognized that optimal spatial datasets were required. Based on available Yukon-wide datasets, these data included:

- National Road network (NRN)
- 1:50,000 Waterbodies
- 1:50,000 Watercourses
- 1:250,000 First Nation Settlement Lands (Surveyed)
- 1:250,000 Parks and Protected Areas
- All Yukon-wide imagery (as available on mapservices.gov.yk.ca)

The analysis to determine potential for fish stocking was determined by applying a set of criteria/guidelines that offered transparency and repeatability to the process; these criteria stated that a waterbody had potential of additional investigations if the following criteria were met.

- Was within 2 km of the NRN layer (access);
- Was over 1 ha in size;
- Did not overlap with any First Nation Settlement Lands, protected areas or parks; and,
- Did not have any connectivity to the watercourse layer.

Using the datasets and criteria listed above, the spatial analysis was set up to include: 1) pre-processing, 2) processing, and, 3) post-processing.

2.1.1 PRE-PROCESSING: CREATION OF INPUTS

A query was applied to the NRN layer that selected for major roads and highways. This initial query avoided all smaller secondary roads, trails, cutlines, and other linear features within the dataset as the intent was to identify waterbodies which were readily accessible. Using the queried NRN layer, a 2 km buffer was created. This layer served as the extent of the analysis and established the study area. The 2 km buffer was also used to clip the Yukon-wide waterbodies and watercourse layers. This allowed for quicker analyses using smaller datasets.

First Nations Settlement Lands and Parks and Protected Areas were merged to form one layer. This provided a layer that would highlight any potential waterbodies within special management areas and required avoidance.

2.1.2 PROCESSING: ANALYSES

The processing component included five steps to derive the information required to determine the suitability of candidate waterbodies for potential fish stocking and to develop a ranking system for each of Environment Yukon's management areas.

Step 1: Select for all 1:50,000 waterbody features within the extent of 2 km buffer layer. Export these data as the baseline waterbodies for the additional analysis (the following steps).

Step 2: Select all waterbody features resulting from Step 1 with the First Nation Settlement Lands, Parks and Protected Areas merged layer. Any lakes that bordered or were within this layer were removed from additional analysis.

Step 3: Perform a visual (heads-up) assessment focusing on waterbody features that have stream connectivity (from previous steps). Target waterbodies that show questionable connectivity when viewed from available imagery (i.e., obvious oultets/inlets indicate good connectivity and these features required deletion from the base waterbody layer while indistinguishable outlets/inlets indicated a potentially isolated waterbody and warranted further assessment).

Step 4: Perform a process to obtain a distance from each waterbody to the nearest point of access (primary roads and secondary roads/trails.

2.1.3 POST-PROCESSING: FINALIZING ANALYSES AND RESULTS

A list of attributes were assigned to each feature during data processing (Table 1) which included five suitability categories for waterbodies based upon relevant scoping criteria such as lake size, proximity to access and stream connectivity (Table 2).

Table 1. Post processing dataset.

Field ID	Description
NTS_MAP50K	The mapsheet number that the waterbody intersects as referenced on the National Topographic System.
Lake_ID	A unique identifier for each waterbody.
Latitude	Latitude of the waterbody in decimal degrees.
Longitude	Longitude of the waterbody in decimal degrees.
Class	A classification ranging from 1 to 6; dependent on which criteria was met during the desktop assessment.
Descrip	Description of the suitability category.
Zone	Environment Yukon management zone.
Area_ha	Area in hectares of the waterbody.
Community	Distance in kilometres from the nearest community.
Primary_Ro	Distance in kilometres from the nearest primary road.
Secondary	Distance in kilometres from the nearest secondary road, trails, cutlines or other linear feature.
Score_area	The ranking score based upon lake size (Table 2), scale of 1 (lowest) to 5 (highest).
Score_comm	The ranking score based upon distance from the nearest community (Table 2), scale of 1 (lowest) to 5 (highest).
Score_prim	The ranking score based upon distance to the nearest primary road (Table 2), scale of 1 (lowest) to 5 (highest).
Score_seco	The ranking score based upon distance to the nearest secondary road, trail, cutline of other linear feature (Table 2), scale of 1 (lowest) to 5 (highest).
Score_tota	The sum of the area, community distance and access primary/secondary road access distance scores, scale of 5 (lowest) to 15 (highest).

Table 2. Classification categories for candidate waterbodies.

Classification	Description
1	Based on standard criteria of waterbody is > 1 ha, is within 2 km of existing access and does not have any stream connectivity using 1:50,000 watercourse layer.
2	Meets criteria as set out in Class 1 EXCEPT there is limited stream connectivity (i.e. mapped connectivity; however, questionable on imagery, requires field investigation).
3	Meets criteria as set out in Class 1 AND access is considered difficult/limited.
4	Meets criteria as set out in Class 1 AND waterbody appears too shallow when viewed using available imagery.
5	Meets criteria as set out in Class 1 EXCEPT there is limited stream connectivity AND access is considered difficult/limited.
6	Meets criteria as set out in Class 1 EXCEPT adjacent to First Nation Settlement Lands.

Further to the above suitability categories, several attributes of the identified waterbodies were processed to produce a scoring criterion to rank potential candidate lakes within each of Environment Yukon's management regions. These attributes included: total lake area (ha), distance to a community (km), and distance to an access road (km) (i.e. distance either to a primary or a secondary road). Each attribute was scored according to a range based on the dataset for that particular parameter (Table 3). For the distance to an access road, the higher score between the primary versus secondary road was used. With all three attributes considered, each lake was assigned an overall score ranging from a low of 3 to a maximum of 15. These scores were used to identify the 10 waterbodies in each management zone that are viable candidates for additional investigation. In cases where several waterbodies have the same scores, sites with the larger area were chosen. Each of the ten highest ranking waterbodies in each zone were also verified with available imagery and any waterbodies not determined to be lakes or consisting of other undesirable characteristics (too shallow, etc) were replaced with the next most suitable waterbody. Where possible, Environment Yukon's database of potential candidate stocked lakes (Foos Pers. Comm. 2016) was used to refine the rankings. For example, some of the candidate lakes identified by the current project were previously determined to be unsuitable for fish stocking and were therefore removed from the rankings.

Table 3. Candidate lake ranking criteria.

Range for each parameter				Score
Area (ha)	Distance to community (km)	Distance to primary road	Distance to secondary road	
> 100	< 10	< 0.25	< 0.5	5
50 – 100	10 – 25	0.25 – 0.5	0.5 – 1	4
10 – 50	25 – 50	0.5 – 1	1 – 1.5	3
5 – 10	50 - 100	1 – 1.5	1.5 – 2	2
1 – 5	> 100	> 1.5	> 2	1

3 RESULTS

The dataset resulting from the desktop analysis initially produced 631 waterbody features throughout the Yukon which were identified as candidate lakes for additional analysis. This total included 26 waterbodies within classification 6 (adjacent to First Nation Settlement Lands). These waterbodies were removed from the dataset prior to the application of the ranking criteria outlined in Table 3. The application of these ranking criteria identified the top candidate lakes for additional investigation within each of Environment Yukon's management regions, including: Kluane, Liard, Northern, Northern Tutchone and Southern Lakes.

3.1 KLUANE

A total of 157 waterbodies were identified in the Kluane management area, with most of these lakes between 1 and 5 hectares in size (141 out of 157). A number of the waterbodies (72) are within 25 km of the nearest community and 22% (34 waterbodies) are less than 250 m from a primary or secondary road. The top 10 candidate lakes include four waterbodies with a combined score of 11 and six waterbodies with combined scores of 10. Within this region, the vast majority of waterbodies are located between the Donjek River bridge and Beaver Creek.

The highest ranking waterbody (Lake 588) in the Kluane region is part of the Enger Lakes complex near Snag Junction (south of Beaver Creek). The larger lake within the Enger Lakes complex is known to contain fish (Arctic grayling, unspecified whitefish and lake chub; Anderton and Tobler 2004, FISS 2017); however, it is not known if there are fish within the candidate water body. The candidate lake is class 2 (limited stream connectivity) which would require field verification. There are a number of similar waterbodies in the Beaver Creek area which scored relatively high and may warrant investigation; such waterbodies include lakes 7, 52, 584, 39 and 43. Lower Timothy Lake (Lake ID 584) has previously been assessed by Environment Yukon (Foos Pers. Comm. 2016) and was determined to be suitable for fish stocking.

The candidate lake 578 is a relatively large waterbody (60 ha) and is located near the north end of Kusawa Lake. This class 2 waterbody may have stream connectivity to the Takhini River; however, its relatively large size and proximity to a popular recreational area (Kusawa Lake) may warrant additional investigation.

Duck Lake (Lake ID 112) is located along the Aishihik Road and does not appear to have stream connectivity. This lake is also relatively large (76 ha) and would be a suitable candidate for additional investigation. There are a number of other candidate waterbodies along the Aishihik Road which did not rank as high as Duck Lake; however, they may also warrant additional investigations due to the proximity to the road. Examples of such waterbodies include lakes 111 (near Martens Lake), 159, 153, 156 and 136.

An additional accessible candidate waterbody is lake 579 adjacent to the Alaska Highway in the Hungry Lake area between Sulphur Lake and Christmas Creek (northwest of Haines Junction). This waterbody is relatively small (7.7 ha) and may have stream connectivity; however, additional investigation may be warranted given that it is one of the only candidate lakes in the Haines Junction area. This waterbody is

included in Environment Yukon's database (Foos Pers. Comm. 2016) of potential candidate lakes; however, no information on the potential for fish stocking is included.

Table 4. Top candidate lakes in the Kluane Management Area.

NTS MAP50K	Lake ID	Latitude	Longitude	Area (ha)	Community Distance(km)	Road Distance (km; S/P)[1]	Class	Score
115K07	588	62.24925	-140.68166	28.1	17.6 – Beaver Creek	0.09 (S)	2	11
115K10	7	62.60791	-140.98814	23.4	25.6 – Beaver Creek	0.03 (P)	1	11
115K07	52	62.45544	-140.83481	1.1	8.4 – Beaver Creek	0.27 (S)	1	11
115A09	578	60.61419	-136.15231	67.0	60.4 - Whitehorse	0.69 (P)	2	10
115H11	112	61.66629	-137.42789	11.5	76.4 – Haines Junction	0.05 (P)	1	10
115B16	579	60.98675	-138.14384	7.7	43.0 – Haines Junction	0.10 (P)	2	10
115K02	584	62.21176	-140.70357	5.8	20.8 – Beaver Creek	0.42 (P)	1	10
115K02	39	62.23856	-140.71067	5.1	17.8 – Beaver Creek	0.90 (P)	1	10
115K07	43	62.25306	-140.69945	5.0	16.8 – Beaver Creek	0.32 (P)	1	10
115K02	40	62.24705	-140.69871	5.0	17.4 – Beaver Creek	0.30 (P)	1	10

[1]Distance either to a primary (P) or secondary road (S), whichever is nearest

3.2 LIARD

A total of 233 waterbodies were identified in the Liard management area, with 175 (75%) of these waterbodies between 1 and 5 hectares in size. The top 10 candidate lakes include five waterbodies with a score of 13 and five waterbodies with a score of 12 (Table 5). The majority of lakes are located in the Faro/Ross River area and near Watson Lake. The top two candidate waterbodies (Lake ID 571 and 518) are both class 1 waterbodies (no clear tributary inlets or outlets), are relatively large (over 50 ha) and located within 25 km of Watson Lake.

Lake 571 is situated east of Watson Lake in an area that appears to be accessed via logging roads; it's not clear whether these logging roads could prove to be a suitable means for access. Unfortunately, imagery is limited to panchromatic (black and white) 15 m satellite data and doesn't provide enough detail to ascertain lake characteristics; however, the size of this lake (89 ha) suggest it may be a good candidate lake. The local name for this waterbody is Diamond Lake and is indicated as suitable for fish stocking in Environment Yukon's database (Foos Per. Comm. 2016).

Lake 518 is accessed via a short secondary road along the Alaska Highway, west of Watson Lake (approx. 4.5 km west of Junction 37). The waterbody has a residential area along its southern shore and residents are likely using the aforementioned road as an egress. Residents may have more information to provide regarding the viability for stocking this waterbody. Imagery shows some shallow areas along the lake shore – mainly on the western shoreline, but it appears relatively deep in most areas. This unnamed waterbody is included in Environment Yukon's database; however, no information on suitability for fish stocking is provided.

Lakes 606 and 613 are relatively large waterbodies (29 and 76 hectares, respectively) with relatively good access. However, both of these lakes are class 2 (potential stream connectivity) and available imagery does not provide an understanding of the significance of this connectivity and therefore, ground assessments may be required to confirm.

Table 5. Top candidate lakes in the Liard Management Area.

NTS MAP50K	Lake ID	Latitude	Longitude	Area (ha)	Community Distance(km)	Road Distance (km; S/P)[1]	Class	Score
105A02	571	60.08518	-128.55354	89.3	8.4 – Watson Lake	0.70 (S)	1	13
105A03	518	60.04695	-129.13880	52.1	23.1 – Watson Lake	0.07 (P)	1	13
105A02	629	60.06273	-128.67980	29.9	1.6 – Watson Lake	0.04 (P)	2	13
105K03	606	62.16091	-133.34869	28.9	7.1 - Faro	0.21 (P)	2	13
105F15	616	61.97062	-132.53420	16.4	3.9 – Ross River	0.01 (P)	2	13
105K04	613	62.21015	-133.59417	76.3	11.1 - Faro	0.68 (S)	2	12
105A02	626	60.18195	-128.97061	18.0	19.3 – Watson Lake	0.10 (P)	2	12
105F15	427	61.98874	-132.56699	13.4	5.6 – Ross River	0.85 (S)	1	12
105A02	627	60.18106	-128.94624	13.0	18.3 – Watson Lake	0.03 (P)	2	12
105A02	628	60.17108	-128.83163	10.2	13.7 – Watson Lake	0.48 (P)	2	12

[1]Distance either to a primary (P) or secondary road (S), whichever is nearest

3.3 NORTHERN

Candidate waterbodies in the Northern region are extremely limited and only four waterbodies were identified for potential investigations, all of which are located along the Dempster Highway[2]. All four waterbodies are less than 10 hectares in size and greater than 100 km from the nearest community (Table 6).

Three of the four waterbodies (Lake IDs 121, 122, 123) are located to the north of Chapman Lake near the Dempster Highway. Of these three waterbodies, Lake ID 121 appears to be the most desirable for additional investigation due to its slightly larger size and apparent depth (from available imagery). The fourth waterbody (Lake ID 118) is located further north along the Dempster Highway and is approximately 8 km south of the Ogilvie airstrip. This is a relatively small waterbody (1.2 ha) and access is limited; however, available imagery appears to indicate that it may be relatively deep.

Table 6. Top candidate lakes in the Northern Management Area.

NTS MAP50K	Lake ID	Latitude	Longitude	Area (ha)	Community Distance(km)	Road Distance (km; S/P)[1]	Class	Score
116B16	121	64.88448	-138.30155	6.5	106.7 – Dawson City	0.63 (P)	1	7
116G09	118	65.60421	-138.16742	1.2	182.4 – Dawson City	0.31 (P)	1	7
116B16	122	64.87525	-138.30687	1.2	105.9 – Dawson City	0.77 (P)	4	6
116B16	123	64.87386	-138.32066	5.0	105.3 – Dawson City	1.31 (P)	4	5

[1]Distance either to a primary (P) or secondary road (S), whichever is nearest

[2] Note that all active and historical mining ponds were excluded from this analysis including all 'dredge ponds'.

3.4 NORTHERN TUTCHONE

A total of 126 waterbodies were identified within the Northern Tutchone Management area, 81% (102 waterbodies) of which are between 1 and 5 hectares in size. The top 10 candidate lakes includes five class 1 waterbodies, four class 2 (limited stream connectivity) and a single class 3 (difficult access; Table 7).

Four of the top 10 candidate lakes are located in the Mayo/Keno area (lakes 268, 225, 259 and 260). Two of the lakes (268 and 260) are located near Hanson Lake and are also near Haldane Lake, which is currently included in the Yukon stocked lakes program. Lake 268 is a suitable candidate for additional investigation as it does not appear to have stream connectivity, is accessible and of moderate size (22.8 ha). Based upon available imagery, this lake appears to have both shallow and deep water areas. Lake 260 is located on the west side of Hanson Lake (without road access) and therefore, may be a lower candidate for additional investigation. Also in the Mayo area is lake 225 (5 Mile Lake) which is highly accessible (with a campground), of moderate size (21.3 ha) and may warrant additional investigation. This lake is included in Environment Yukon's database; however, no information on the suitability for fish stocking is included.

Two of the top candidate lakes are located in the vicinity of Pelly Crossing (lakes 177 and 599). Both waterbodies are located just south of the community on the west side of the North Klondike Highway. Based upon available imagery, both lakes may be too shallow but would require field verification.

The remaining four candidate lakes in the region are located in the Carmacks area with one lake on the Freegold Road (lake 600), two near the Mt. Nansen road (lakes 601 and 602) and one lake (215) located just north of Carmacks, likely directly adjacent to private property. Lake 600 is located directly adjacent to the Freegold Road and appears to be a relatively deep lake. Among the two lakes on the Mt. Nansen Road, lake 602 has easier access but 601 appears deeper. Based upon available imagery, this lake 602 appears to have two separate deep basins separated by a shallow area. The lake does appear to have limited stream connectivity which would require field verification.

Table 7. Top candidate lakes in the Northern Tutchone Management Area.

NTS MAP50K	Lake ID	Latitude	Longitude	Area (ha)	Community Distance(km)	Road Distance (km; S/P)[1]	Class	Score
105M14	268	63.98732	-135.36505	22.8	8.9 - Keno	0.07 (S)	1	13
105M12	225	63.65445	-135.88833	21.3	6.3 - Mayo	0.01 (P)	1	13
106D03	259	64.01230	-135.28864	10.6	11.1 - Keno	0.35 (S)	1	12
115I15	177	62.76629	-136.62551	9.7	6.8 – Pelly Crossing	0.15 (P)	1	12
115I01	600	62.12328	-136.35822	5.7	4.6 - Carmacks	0.02 (P)	2	12
115I05	599	62.76572	-136.65374	28.1	7.2 – Pelly Crossing	0.64 (P)	2	11
106D03	260	64.00051	-135.37212	25.9	10.4 - Keno	0.58 (S)	3	11
115I01	601	62.06030	-136.42706	11.1	8.1 – Carmacks	0.62 (P)	2	11
115I01	602	62.05563	-136.40936	5.1	7.6 - Carmacks	0.34 (P)	2	11
115I01	215	62.13848	-136.31377	2.5	4.8 - Carmacks	0.15 (P)	1	11

[1]Distance either to a primary (P) or secondary road (S), whichever is nearest

3.5 SOUTHERN LAKES

A total of 85 candidate waterbodies were identified in the Southern Lakes area, the majority (87%) of which are between 1 and 5 hectares in size. Of the top 10 candidate lakes in the region, eight are located in the Whitehorse area, one in the Marsh Lake area and one near Carcross. In the Whitehorse area, Ear Lake (lake 287, near Robert Service Way) is identified as high scoring waterbody (note this lake appears to be subject to water fluctuations). The area near the Whitehorse sewage lagoon contains two of the top candidate waterbodies (lakes 326 and 312). Lake 326 (Harmon Lake #4) is included in the Environment Yukon database as well; however, no information on stocking suitability is provided. Lake 307 is a small lake located near Hidden Lake 2 in the Chadburn Lake Park in Whitehorse and lake 303 is located to the southeast of McLean Lake.

Lake 328 is the highest ranking waterbody in the region and is a 12 hectare located within the Judas Creek subdivision (Marsh Lake). This lake does not appear to have stream connectivity, is very accessible and likely warrants additional investigation.

Lake 283 is located near the Hootalinqua Ranch on the South Klondike Highway (approximately 4 km north of Emerald Lake; 15.2 km from Carcross) and may also warrant field investigations.

Table 8. Top candidate lakes in the Southern Lakes Management Area.

NTS MAP50K	Lake ID	Latitude	Longitude	Area (ha)	Community Distance(km)	Road Distance (km; S/P)[1]	Class	Score
105D08	328	60.45087	-134.26421	12.1	15.8 – Marsh Lake	0.04 (S)	1	12
105D11	287	60.67876	-135.04246	7.9	5.0 - Whitehorse	0.02 (S)	1	12
105D07	283	60.30277	-134.77009	5.1	15.2 - Carcross	0.01 (P)	1	11
105D14	326	60.80059	-135.12387	2.7	8.9 - Whitehorse	0.04 (P)	1	11
105D11	296	60.73238	-135.04011	2.5	1.3 - Whitehorse	0.49 (P)	1	11
105D11	305	60.63819	-135.02895	1.8	9.8 - Whitehorse	0.07 (P)	4	11
105D10	293	60.69456	-134.96242	1.8	6.3 - Whitehorse	0.28 (P)	1	11
105D14	312	60.80477	-135.12260	1.4	9.3 - Whitehorse	0.09 (P)	1	11
105D11	307	60.68579	-135.01101	1.4	5.1 - Whitehorse	0.07 (S)	1	11
105D11	303	60.65646	-135.06734	1.3	7.6 - Whitehorse	0.11 (S)	1	11

[1]Distance either to a primary (P) or secondary road (S), whichever is nearest

4 CONCLUSION

The results of this project identified a number of potential candidate lakes that met the established criteria which Environment Yukon may use to conduct additional investigation to confirm fish stocking potential. In many cases, ground truthing of potential stream connectivity may be required. Assessing winter water quality (dissolved oxygen), presence of fish, connectivity and a general fish habitat assessment would be required to determine the suitability for fish stocking.

5 LITERATURE CITED

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5.1 PERSONAL COMMUNICATION

Foos. A. 2016. Personal communication (email) to EDI on January 5, 2017 including working database files (Environment Yukon) regarding potential candidate lakes for fish stocking throughout the Yukon.