Keeyask Generation Project

Environmental Impact Statement

Supporting Volume

Aquatic Environment

Hydropower Limited Partnership

June 2012

APPENDIX 5D
VEC FISH SPECIES SPAWNING HABITAT IN THE STUDY AREA

5D.1 WALLEYE

5D.1.1 SPLIT LAKE AREA

Potential walleye spawning areas in the Split Lake area are illustrated in Map 5D-1.

1. Moderate numbers of larval walleye were captured in the spring in drift traps set immediately downstream of First Rapids in both 2001 and 2002. Moderate numbers of walleye in spawning condition, including two ripe females, were captured in the Burntwood River in 2002 between 07 and 14 June, when water temperatures were between 5 and 12°C. All of these fish were captured at sites immediately below the rapids, so it is likely that spawning occurred nearby.
2. A small number of walleye were captured in this area in spawning condition during the spring of 2002. Three fish that were preparing to spawn were captured on 16 June and a ripe male and five spent males were captured nine days later; water temperature during this period ranged from 14–17°C. This area likely provides some suitable habitat for spawning.
3. Large numbers of walleye eggs and/or larvae were captured in drift traps set in this area during the spring of 2001 and 2002. Moderate numbers of walleye were also captured in ripe or near-ripe condition at the hoopnet site immediately upstream of the drift trap location. Most of these fish were moving in the upstream direction at the time of capture. The only fish identified as spent was moving downstream.
4. Large numbers of walleye that were in ripe or near-ripe condition were captured in hoop nets set in this area during the spring of 2001 and 2002. About equal numbers of these fish were captured moving towards Assean Lake as away from the lake.
5. Moderate numbers of walleye that were in ripe or near-ripe condition were captured in hoop nets set this area during the spring of 2001 and 2002. Most of these fish were moving in the upstream direction at the time of capture.
6. A small number of walleye that were in ripe or near-ripe condition were captured in hoop nets set this area during the spring of 2001 and 2002. Most of these fish were moving in the upstream direction at the time of capture.
7. Moderate numbers of walleye in ripe and running condition were captured in this area. Many of the walleye captured in this stretch had already spawned. This area likely provides some suitable habitat for spawning. YFFN Members have identified spawning areas on the upper reaches downstream of the community cabins (Hilderman, Thomas, Frank and Cram 2002).
8. Same as # 7 above.
9. The area likely provides some suitable habitat for spawning. Moderate numbers of ripe and running walleye were captured in this area. A greater proportion of the catch was in spawning condition compared to downstream areas. One walleye that was originally captured in ripe

condition in this area was later recaptured in spent condition at a site further downstream, suggesting that fish return downstream after spawning in the upper reaches of the river.

10. Large numbers of walleye, many of which were in spawning or spent condition, were captured in this area during the spring of 2003 and 2004. Most of the fish that were ripe or near-ripe were moving upstream at the time of capture, suggesting that fish likely move into the Aiken River from Split Lake to spawn. The upstream run occurred earlier in 2003 (15 to 20 May) than in 2002 (21 May to 09 June), likely due to increased water temperatures in the former year. The recapture of four walleye in spent condition a few days after initially being captured in pre-spawn condition at the upstream sites, which are located near the rail crossing, suggests that walleye likely spawn near these sites. As well, several of the walleye that had initially been captured at these upstream sites in spawning condition, were later recaptured in spent condition at sites further downstream in the river. Many of the walleye captured in spawning condition at the time of their initial capture in 2002 were recaptured in the Aiken River in spawning condition again the following spring, indicating that some portion of the walleye population returns to the Aiken River to spawn in successive years. YFFN Members have identified spawning areas between cabin sites (Hilderman, Thomas, Frank and Cram 2002).

5D.1.2 KEEYASK AREA

Potential walleye spawning areas in the Keeyask area are illustrated in Map 5D-2.

1. Radio-tagged walleye were frequently detected in this area during late-May and early June in every year that tracking occurred. A few walleye have been captured in this area in near-spawn condition.

2. A few of the radio-tagged walleye were detected below Birthday Rapids during the spring when water temperatures were within the species' spawning range in 2002 and 2003. Moderate numbers of ripe and pre-spawning walleye have been captured in this area during the spring. Only a few larval walleye were captured in drift traps set in this area during the spring of 2001; water temperatures at this time were between 15 and 16°C. However, large numbers of larvae that could only be identified as percid and *Sander* sp. were captured in subsequent years. Water temperatures were a few degrees higher at the start of drift sampling in these years (more than 15°C).

3. Two walleye in spawning condition were captured in this area during the spring of 2004 and this habitat likely provides suitable spawning habitat.

4. One ripe walleye was captured in this area during the spring of 2004 and this area likely provides suitable spawning habitat. A few larval fish that could only be identified as belonging to the family Percidae were captured downstream of this area during spring of 2003 and 2004.

5. This area provides some suitable habitat for spawning and a few ripe and running walleye have been captured in this area during the spring.

6. Same as # 5 above. As well, several spent individuals have been captured here.

7. This area provides some suitable habitat for spawning and a few pre-spawn and spent walleye have been captured in this area during the spring.

8. Same as # 7 above.

9. Same as # 7 above.

10. Spent walleye have been captured in this area during the spring.

11. A few larval fish that could only be identified to family Percidae were captured in this area during spring of 2002. A few ripe or near-ripe fish were also captured in this area during the spring. This area provides some suitable habitat for spawning.

12. Larval walleye were captured in this area during spring 2001–2003. Larval walleye were also captured downstream of this area in 2003, but these fish likely drifted downstream from Gull Rapids. Although larval walleye were not identified in the 2004 drift trap catch, a number of larvae that could only be identified as percids were observed, some of which were likely walleye. Walleye larvae were observed in drift traps when the water temperature in the Nelson River ranged between 15 and 21°C. Large numbers of ripe and near-ripe walleye were also captured in this area during the spring. Spawning fish were generally captured when the water temperature ranged from 7 to 17°C. Although relocation data for fish below Gull Rapids is limited, three of the radio-tagged walleye were detected in this area during the time water temperatures were in the appropriate range for walleye spawning in the years that telemetry was collected (2002 and 2003). Post-spawn walleye have also been captured along this stretch. The KCNs have indicated that Gull Rapids provides spawning habitat (FLCN 2010 Draft; CNP Keeyask Environmental Evaluation Report; FLCN Environment Evaluation Report [Draft]).

13. Large numbers of ripe and near-ripe walleye were captured in this area during the spring. Spent walleye were also captured in this stretch.

14. Same as # 13 above. Also, one of the radio-tagged walleye was detected in this area during the time water temperatures were in the appropriate range for walleye spawning in 2002.

15. A few near-ripe and ripe walleye were captured in this area. Spent walleye were also captured in this stretch.

5D.1.3 STEPHENS LAKE AREA

Potential walleye spawning areas in the Stephens Lake area are illustrated in Map 5D-3.

1. This area provides some suitable habitat for spawning and moderate numbers of ripe and running walleye were captured in the area from 22–28 May 2003, when water temperatures in the river ranged from 10–15°C. However, larvae were not captured in drift traps set in the area. FLCN Members have reported that walleye spawn in the North Moswakot River (FLCN 2010 Draft).

2. This area provides some suitable habitat for spawning and moderate numbers of ripe and running walleye were captured in the area from 23–29 May 2003, when water temperatures

ranged from 14 to 16°C. However, larvae were not captured in drift traps set in the area. FLCN Members have reported that walleye spawn in the South Moswakot River (FLCN 2010 Draft).

3. This area provides some suitable habitat for spawning and a few ripe and running walleye were captured in the area during the spring of 2005. Walleye eggs were not observed. FLCN Members have reported that walleye spawn in Looking Back Creek (FLCN 2010 Draft).

4. FLCN Members report that walleye spawning in the far corner of Ferris Bay (FLCN 2010 Draft).

5D.2 NORTHERN PIKE

5D.2.1 SPLIT LAKE AREA

Potential northern pike spawning areas in the Split Lake area are illustrated in Map 5D-4.

1. A few larval northern pike were captured in drift traps set below the rapids during the spring of 2001. A moderate number of ripe or near-ripe northern pike were captured in this area during the spring of 2002 when water temperatures ranged from 7–13°C.

2. A small number of ripe or near-ripe northern pike were captured in this area during the spring of 2002.

3. Same as # 2 above.

4. A moderate number of ripe or near-ripe northern pike were captured in this area during the spring of 2002 when water temperatures were between 11–12°C.

5. A small number of near-ripe northern pike were captured in this area during the spring of 2004.

6. A small number of ripe or near-ripe northern pike were captured in this area during the spring of 2004.

7. Same as # 6 above.

8. Same as # 6 above.

9. Large numbers of near-ripe northern pike and a few ripe northern pike were captured in this area during the spring of 2002. Most of these fish were moving upstream. A small number of northern pike larvae were captured in drift traps set downstream of the hoop nets in 2001 and 2002. Spent northern pike were also observed in this stretch; these fish were moving downstream.

10. Large numbers of near-ripe northern pike and a few ripe northern pike were captured in this area during the spring of 2001 and 2002. Post-spawn northern pike were also observed in this stretch.

11. A few near-ripe northern pike were captured in this area during the spring of 2001 and 2002. Spent northern pike were also captured in this stretch.

12. Same as # 11 above.

13. Moderate numbers of spent northern pike were captured in this area during spring in 2003.

14. Large numbers of northern pike that were in ripe condition were captured in this area during the spring of 2003 and 2004. Large numbers of spent northern pike were also captured here. In 2003, spawning was likely mostly completed by the time sampling commenced since water temperatures were consistently above 10°C and more northern pike were in spent rather than pre-spawn condition. In contrast, large numbers of ripe or near-ripe fish were captured from 05–09 June 2004, when water temperatures ranged from 5–13°C.

15. Large numbers of northern pike were observed in this area during the spring of 2002 and 2003, many of which were in spawning condition. Movement data from the hoop nets suggest that northern pike move to upstream locations in the river to spawn and return downstream to Split Lake post-spawn.

5D.2.2 KEEYASK AREA

Potential northern pike spawning areas in the Keeyask area are illustrated in Map 5D-5.

1. Radio-tagged northern pike were frequently detected in this area when water temperatures were within the species' preferred spawning range in both 2002 and 2003. A few ripe and near-ripe northern pike have also been captured here in the spring.

2. This area provides suitable spawning habitat for northern pike and a few ripe and near-ripe fish have been captured here in the spring.

3. Same as # 2 above.

4. Same as # 1 above.

5. A few sexually mature northern pike that were preparing to spawn were captured in this area. Around the same time, one of the radio-tagged northern pike was detected in this area in both 2002 and 2003.

6. A moderate number of ripe and near-ripe northern pike have been captured in this area during the spring.

7. Same as # 2 above.

8. Same as # 2 above.

9. Same as # 2 above.

10. Same as # 2 above. As well, moderate numbers of larval northern pike were captured in drift traps set upstream in the creek in 2001 and 2003.

11. Same as # 2 above.

12. Same as # 2 above. However, only a single larval northern pike was ever captured in the creek.

13. Same as # 2 above. As well, moderate numbers of larval northern pike were captured in drift traps set upstream in the creek in 2001 and 2002.

14. Sexually mature northern pike have been captured in this area in ripe or near spawn condition every spring that sampling has been conducted (2001–2004). At around the same time of year, a few of the radio-tagged northern pike were frequently detected in this area during the spring in both 2002 and 2003. A few larval northern pike have been captured in drift traps set below the rapids during the spring of 2001. Larvae were virtually absent from traps set in subsequent years, but the water temperature at the start of these programs exceeded the temperature at which northern pike larvae were captured in 2001 (14–16°C).

15. This area provides suitable spawning habitat for northern pike. However, no larvae were captured in this creek in 2003.

16. In all years that maturity was assessed as part of gillnetting studies (2001–2004), northern pike that were ripe or near-ripe northern pike were captured in this area. Spawning fish were generally captured when water temperatures in the lake ranged from 8–16°C. Around the same time of year (late-May to early June), one of the radio-tagged northern pike was detected in this area multiple times. A few larval northern pike were captured in drift traps set in 2001 and 2003. Larvae were generally observed in the catch when water temperatures ranged between 14 and 18°C. Drift traps set in 2002 were likely set too late in the season to capture larval northern pike as the water temperature had already reached 17°C by the first day of sampling. The KCNs have indicated that Gull Rapids provides spawning habitat (FLCN 2010 Draft; CNP Keeyask Environmental Evaluation Report; FLCN Environment Evaluation Report [Draft]).

17. A few ripe and near-ripe northern pike and a few larval northern pike were captured in this area during the spring of 2003. The KCNs have indicated that Gull Rapids provides spawning habitat (FLCN 2010 Draft; CNP Keeyask Environmental Evaluation Report; FLCN Environment Evaluation Report [Draft]).

18. This area provides suitable spawning habitat for northern pike, although the tributaries may not be accessible in all years. Several ripe and near-ripe northern pike were captured in the bay in 2004 but only one ripe female was captured in the tributary as part of sampling conducted in 2005 and 2006.

19. Same as # 18 above. Spent northern pike were captured in Pond 13 during the spring of 2006; however, larvae were not captured here.

5D.2.3 STEPHENS LAKE AREA

Potential northern pike spawning areas in the Stephens Lake area are illustrated in Map 5D-6.

1. A few ripe and running northern pike were captured in this area during the spring of 2003; however, larvae were not captured. FLCN Members have reported that northern pike spawn in the Moswakot rivers (FLCN 2010 Draft).

2. A few ripe and running northern pike were captured in this area during the spring of 2003.

3. Same as # 1 above.

4. Same as # 2 above.

5. A few ripe and near-ripe northern pike were captured in the area during the spring of 2005; however, northern pike eggs were not observed. Spent northern pike were also observed in this stretch. FLCN Members have reported that northern pike spawn in Looking Back Creek (FLCN 2010 Draft).

5D.3 LAKE WHITEFISH

5D.3.1 SPLIT LAKE AREA

Potential lake whitefish spawning areas in the Split Lake area are illustrated in Map 5D-7.

1. A few larval lake whitefish and unidentified coregonines were captured in drift traps set during the spring of 2001 and 2002. Spawning adults have not been observed at this location as sampling has not been conducted in this area during the fall.

2. Large numbers of ripe or near-ripe lake whitefish were captured in this area during the fall of 2001 and 2002. Many of these fish were recaptured in spawning condition on multiple occasions over the sampling period. Several of these fish were subsequently recaptured in post-spawn condition. Therefore, it is likely that the lake whitefish holding at this location had spawned nearby. The recapture of several spawning lake whitefish during the fall of 2002 in approximately the same location in which they had been tagged the previous year suggests that lake whitefish may return to the same location to spawn in successive years.

3. A number of sexually mature lake whitefish were captured at the mouth of the Aiken River during the fall of 2004; however, only one fish was in spawning condition at the time of capture. The absence of lake whitefish in the river itself suggests that lake whitefish may stage at the mouth prior to upstream spawning movement. The lack of ripe or ripening fish suggests that spawning had not yet occurred in this area by the end of the sampling program and that spawning movements may have occurred only after ice formation.

5D.3.2 KEEYASK AREA

Potential lake whitefish spawning areas in the Keeyask area are illustrated in Map 5D-8.

1. Several larval lake whitefish and unidentified coregonines were captured in drift traps set in this area during the spring of 2001, 2003, and 2004. However, few spawning adults have been captured in this area during the fall. Ripe fish were only observed in 2003, during which time water temperatures ranged from 4–7°C. In 2002, one of the acoustic-tagged lake whitefish was relocated in this area during late September.

2. A few of the radio-tagged and/or acoustic-tagged lake whitefish were relocated in this area when water temperatures were within the species preferred spawning range in 2001 and 2002. Also, a

few larval lake whitefish were captured in neuston tows conducted in this area in spring 2003 and 2004.

3. Large numbers of ripe or near-ripe lake whitefish were captured in this area during fall of 2001–2003. Many of the pre-spawn fish were recaptured on multiple occasions below the rapids, several of which were later recaptured in ripe condition. A few larval *Coregonus* were also captured in this stretch during spring 2003, suggesting that lake whitefish had spawned in the area the previous fall.

4. Coregonine larvae were captured in this area during spring 2003, suggesting that lake whitefish had spawned in the area the previous fall. The KCNs have indicated that Gull Rapids provides spawning habitat (FLCN 2010 Draft; CNP Keeyask Environmental Evaluation Report; FLCN Environment Evaluation Report [Draft]).

5D.3.3 STEPHENS LAKE AREA

Potential lake whitefish spawning areas in the Stephens Lake area are illustrated in Map 5D-9.

1. A few ripe and near-ripe lake whitefish were captured in this area during the fall of 2002 and 2003. However, no larvae were captured in this stretch during the spring of 2003. FLCN Members have reported that lake whitefish spawn in the Moswakot rivers (FLCN 2010 Draft).

2. Same as # 1 above.

3. FLCN have reported that lake whitefish spawn in Looking Back Creek (FLCN 2010 Draft).

4. FLCN have reported that lake whitefish spawn in Ferris Bay (FLCN 2010 Draft).

5D.4 REFERENCES

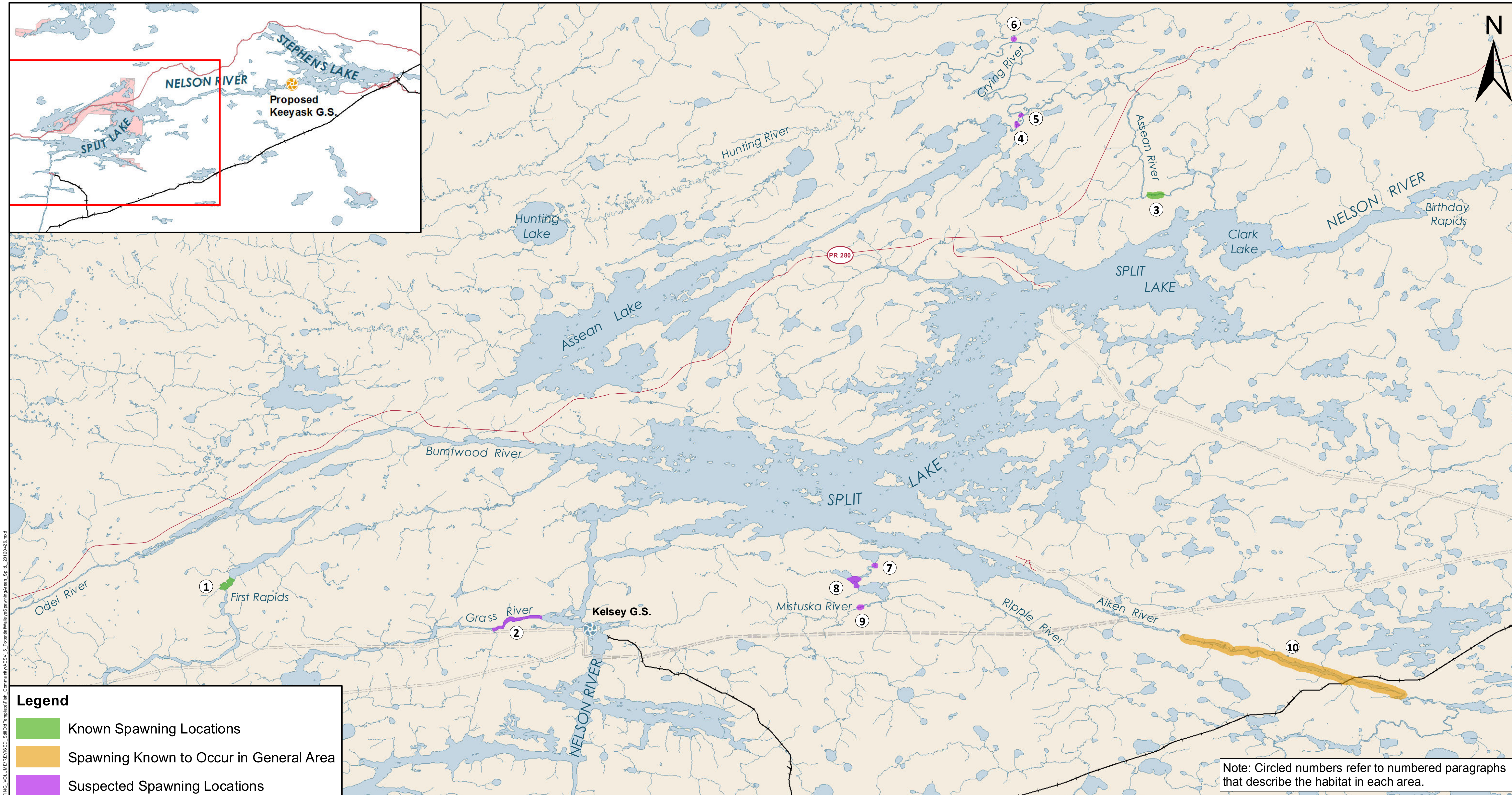
5D4.1 LITERATURE CITED

CNP Keeyask Environmental Evaluation Report. 2012. Keeyask Environmental Evaluation: A report on the environmental effects of the proposed Keeyask Project on Tataskweyak Cree Nation and War Lake First Nation. January 2012. 78 pp. + appendices.

FLCN. 2010 Draft. Keeyask traditional knowledge report. Fox Lake Cree Nation, MB.

FLCN Environment Evaluation Report (Draft). Fox Lake Cree Nation Environment Evaluation Report (Draft). Draft submitted by: Fox Lake Cree Nation - Negotiations June 7, 2012.

Hilderman, Thomas, Frank, and Cram. 2002. Initial Community-Based Environmental Overview: Proposed Keeyask Hydro Project Final Report. Winnipeg, MB. 72 pp.


STEPHENS LAKE
NELSON RIVER
Proposed
Keeyask G.S.
SPLIT LAKE
N
6
Crying River
5
4
Hunting River
Assean River
3
NELSON RIVER
Birthday
Rapids
Clark
Lake
SPLIT
LAKE
Hunting
Lake
PR 280
Assean Lake
Burntwood River
SPLIT LAKE
7
8
Mistuska River
9
1
First Rapids
Odei River
Grass River
2
Kelsey G.S.
NELSON RIVER
Ripple River
Aiken River
10
Legend
Known Spawning Locations
Spawning Known to Occur in General Area
Suspected Spawning Locations
Note: Circled numbers refer to numbered paragraphs
that describe the habitat in each area.

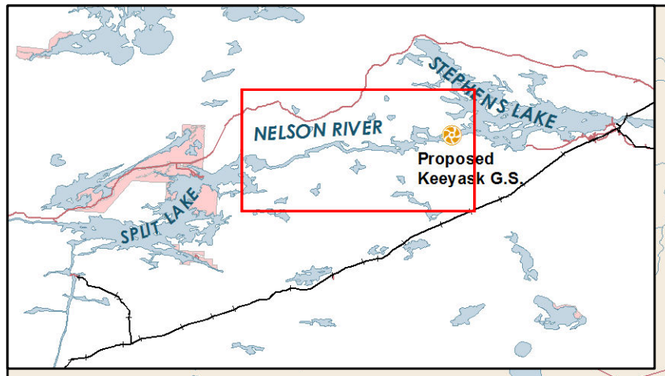
KEEYASK
Hydropower Limited Partnership

0 5 10 15 20 Kilometres
0 2.5 5 7.5 10 Miles

Projection: UTM Zone 15, NAD 83
Data Source: NTS base 1:50 000

Potential Walleye Spawning Areas

Selected Tributaries in the Split Lake Area



N

Ross Wright Bay

STEPHENS LAKE

O'Neil Bay

Looking Back Creek

PR 280

Effie Creek

Hidden Creek

Pond 13

Caribou Island

Gull Rapids

Two Goose Creek

Trickle Creek

GULL LAKE

NELSON RIVER

Fork Creek

Birthday Rapids

Nap Creek

Portage Creek

Rabbit Creek

Seebeesis Creek

Clark Lake

Long Rapids

Carscadden Lake

Note: Circled numbers refer to numbered paragraphs that describe the habitat in each area.

Legend

- Known Spawning Locations
- Spawning Known to Occur in General Area
- Suspected Spawning Locations

KEEYASK
Hydropower Limited Partnership

0 2.5 5 7.5 10 Kilometres

0 1.25 2.5 3.75 5 Miles

Projection: UTM Zone 15, NAD 83
Data Source: NTS base 1:50 000
Stephens Lake Shoreline - Quickbird@Digitalglobe, 2006
Nelson River Shoreline modelled by Manitoba Hydro

Potential Walleye Spawning Areas

Keeyask Area

Map 5D-2

N

North Moswakot River

South Moswakot River

Looking Back Creek

PR 280

STEPHENS LAKE

Callan Island

Ferris Bay

Pond 13

Proposed Keeyask G.S.

Gull Rapids

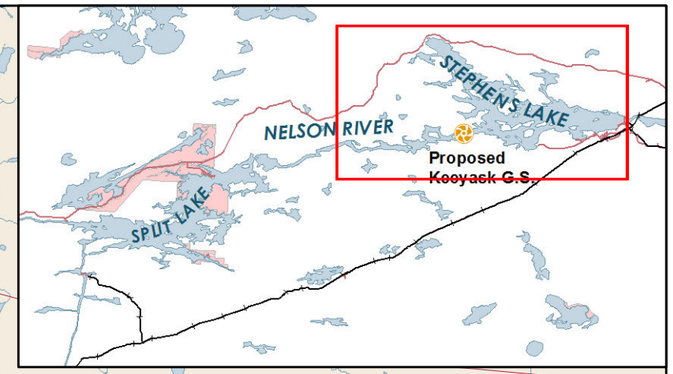
GULL LAKE

NELSON RIVER

Kettle G.S.

Butnau Dam

PR 280



Legend

Spawning Known to Occur in General Area

Note: Circled numbers refer to numbered paragraphs that describe the habitat in each area.

KEEYASK Hydropower Limited Partnership

0 5 10 Kilometres

0 2.5 5 Miles

Projection: UTM Zone 15, NAD 83
Data Source: NTS base 1:50 000,
Stephens Lake Shoreline-Quickbird@Digitalglobe, 2006
Nelson River Shoreline modelled by Manitoba Hydro

Potential Walleye Spawning Areas

Selected Tributaries in the Stephens Lake Area

Map 5D-3

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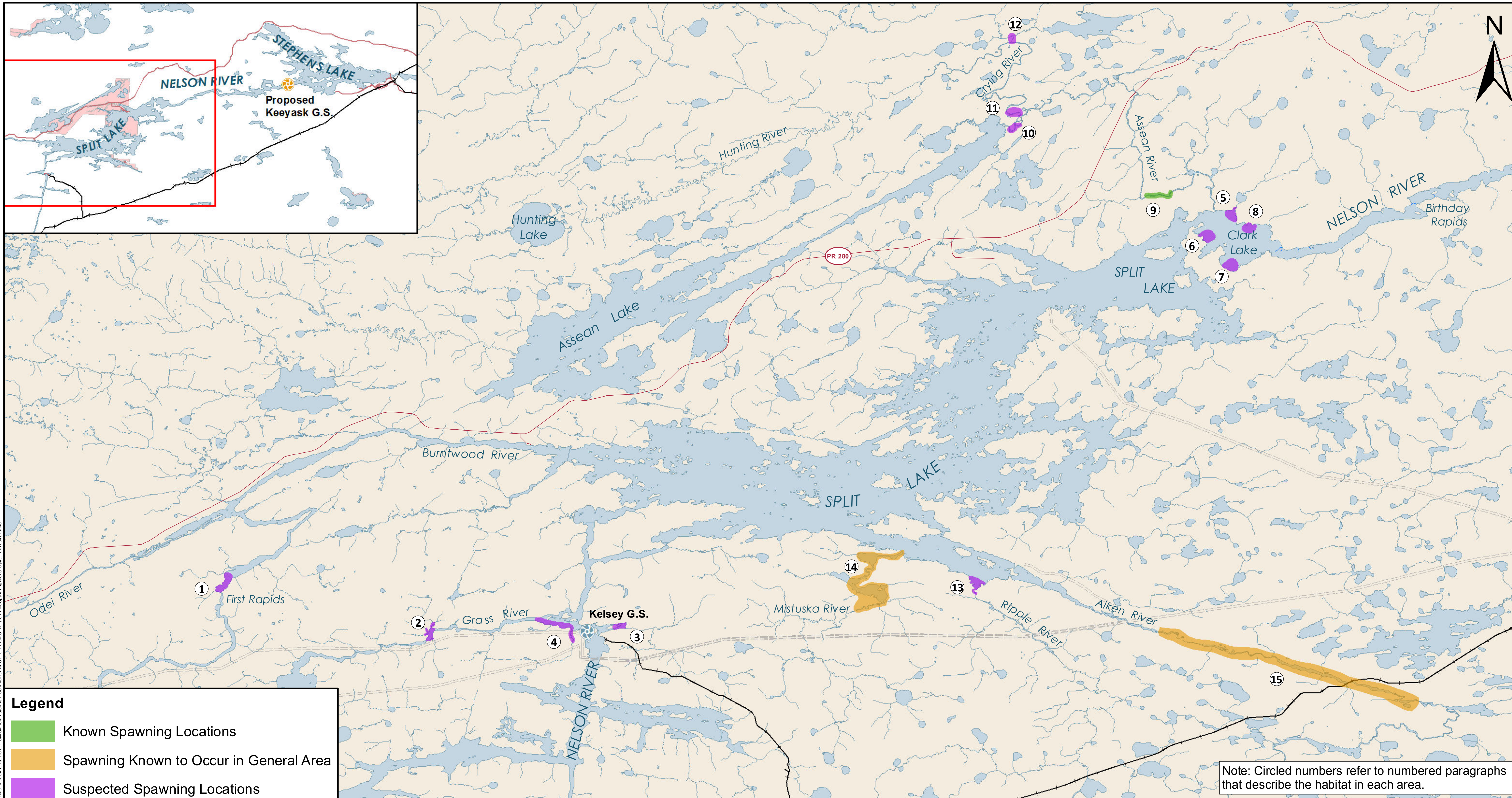

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KEEYASK
Hydropower Limited Partnership

0 5 10 15 20 Kilometres
0 2.5 5 7.5 10 Miles

Projection: UTM Zone 15, NAD 83
Data Source: NTS base 1:50 000

Potential Northern Pike Spawning Areas

Selected Tributaries in the Split Lake Area

Map 5D-4