Keeyask Generation Project

Environmental Impact Statement

Response to EIS Guidelines

KEEYASK

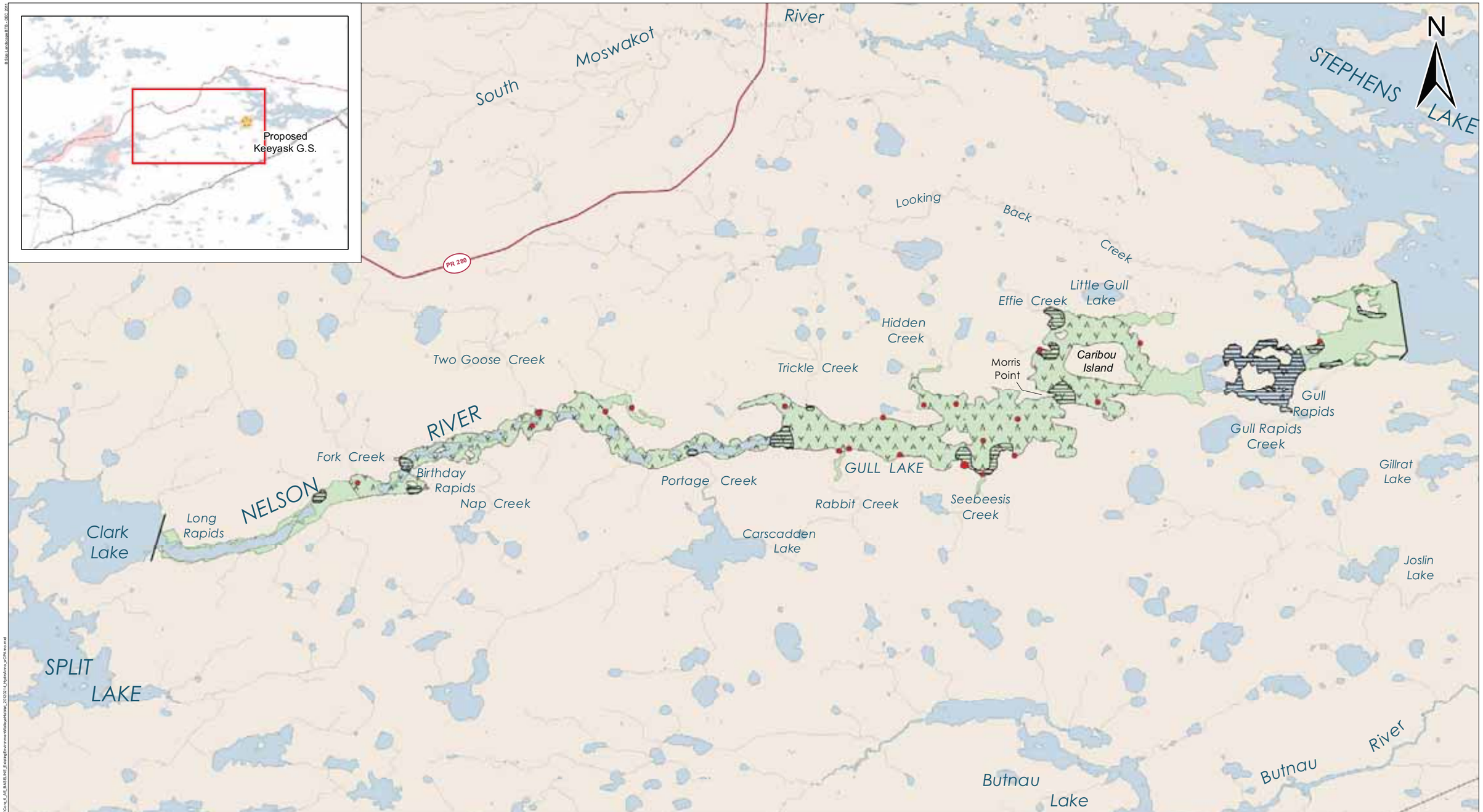
Hydropower Limited Partnership

June 2012

CHAPTER 6

ENVIRONMENTAL EFFECTS ASSESSMENT

KEEYASK
Hydropower Limited Partnership



KEEYASK
Hydropower Limited Partnership

DATA SOURCE:
Manitoba Hydro, North/South Consultants, Government of Canada
gull-ee-95perc-4327cms-rev3

CREATED BY:
North/South Consultants

COORDINATE SYSTEM:	DATE CREATED:	REVISION DATE:
UTM NAD 1983 Z15N	26-MAR-10	28-MAY-12
0 1.5 3 Kilometres / 0 1 2 Miles	VERSION NO: 3.0	QA/QC: APPROVED

Legend

- Spawning
- Overwintering
- Foraging

Young-of-the-Year Captures

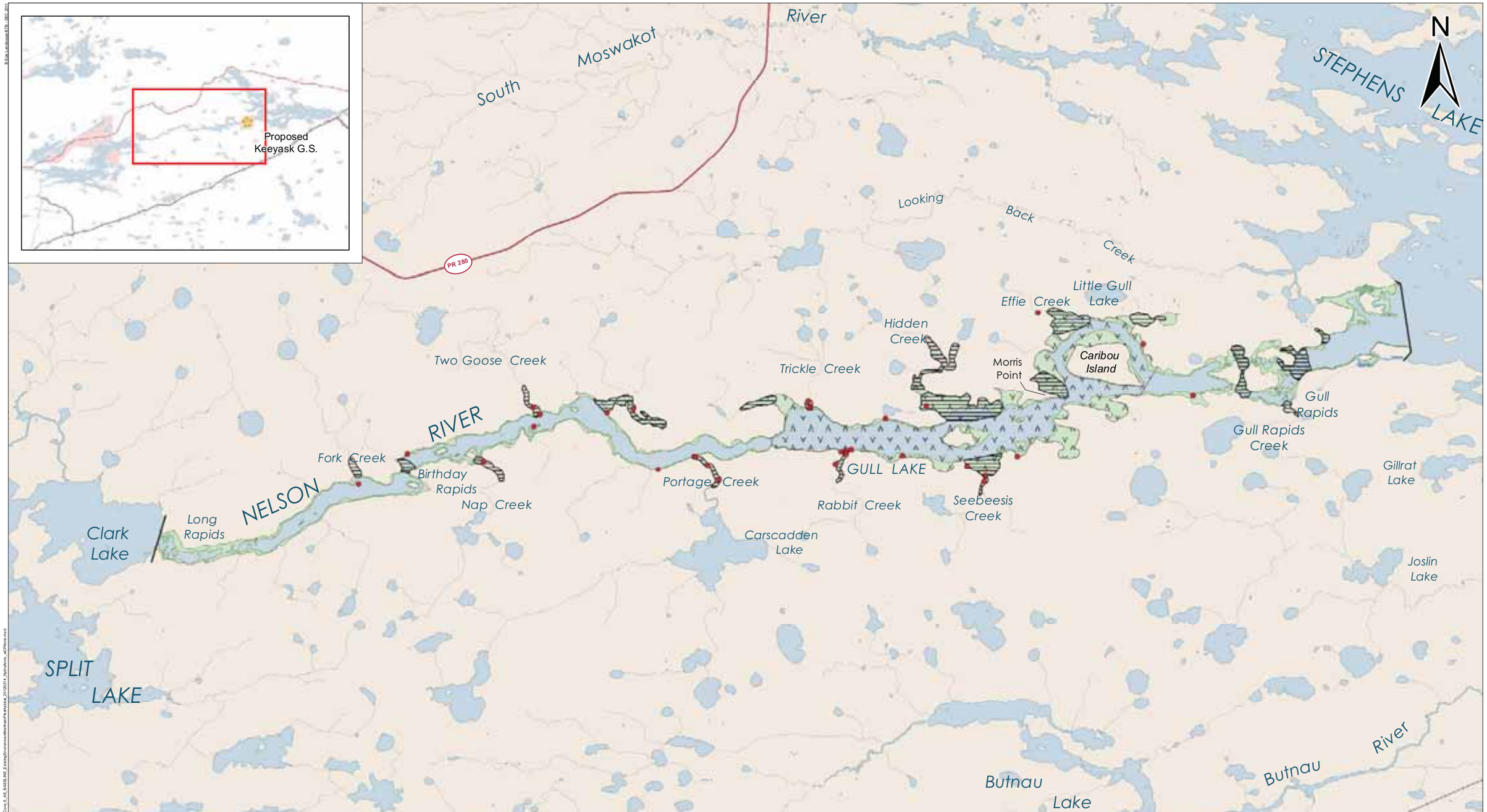
- < 25
- 26 - 99
- > 100

Clark Lake to Stephens Lake Area Boundary

Note: Shows 95th percentile inflow.

Walleye Habitat
Existing Environment

Map 6-21



KEEYASK Hydropower Limited Partnership

DATA SOURCE:
Manitoba Hydro, North/South Consultants, Government of Canada
gull-ee-95perc-4327cms-rev3

CREATED BY:
North/South Consultants

COORDINATE SYSTEM:	DATE CREATED:	REVISION DATE:
UTM NAD 1983 Z15N	26-MAR-10	28-MAY-12
0 1.5 3 Kilometres / 0 1 2 Miles	VERSION NO: 3.0	QA/QC: APPROVED

Legend

- Spawning
- Overwintering
- Foraging

Young-of-the-Year Captures

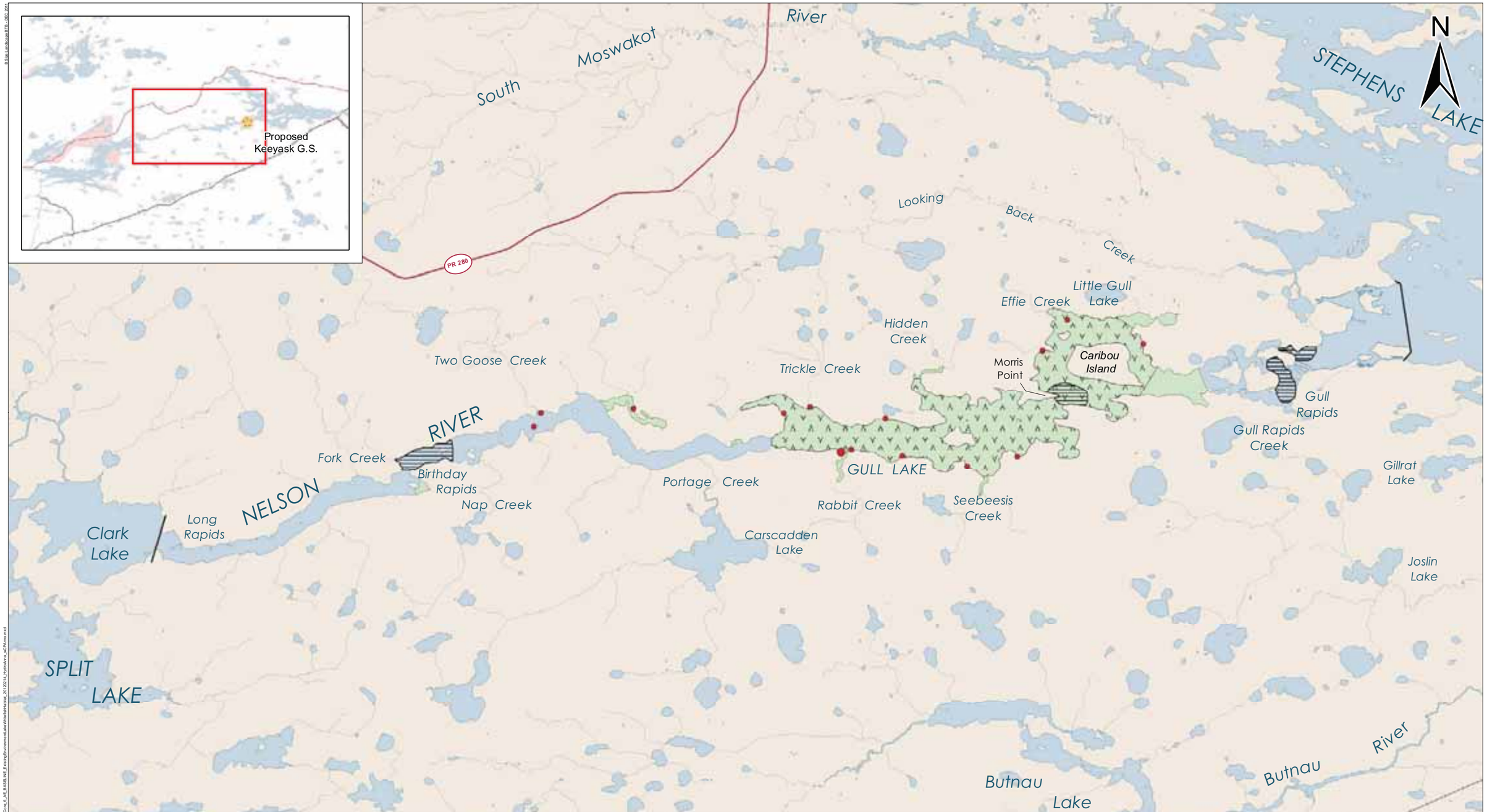
- < 25
- 26 - 99
- > 100

Clark Lake to Stephens Lake Area Boundary

Note: Shows 95th percentile inflow.

Northern Pike Habitat
Existing Environment

Map 6-22



KEEYASK
Hydropower Limited Partnership

DATA SOURCE:
Manitoba Hydro, North/South Consultants, Government of Canada
gull-ee-95perc-4327cms-rev3

CREATED BY:
North/South Consultants

COORDINATE SYSTEM:	DATE CREATED:	REVISION DATE:
UTM NAD 1983 Z15N	26-MAR-10	28-MAY-12
0 1.5 3 Kilometres / 0 1 2 Miles	VERSION NO: 3.0	QA/QC: APPROVED

Legend

- Spawning
- Overwintering
- Foraging

Young-of-the-Year Captures

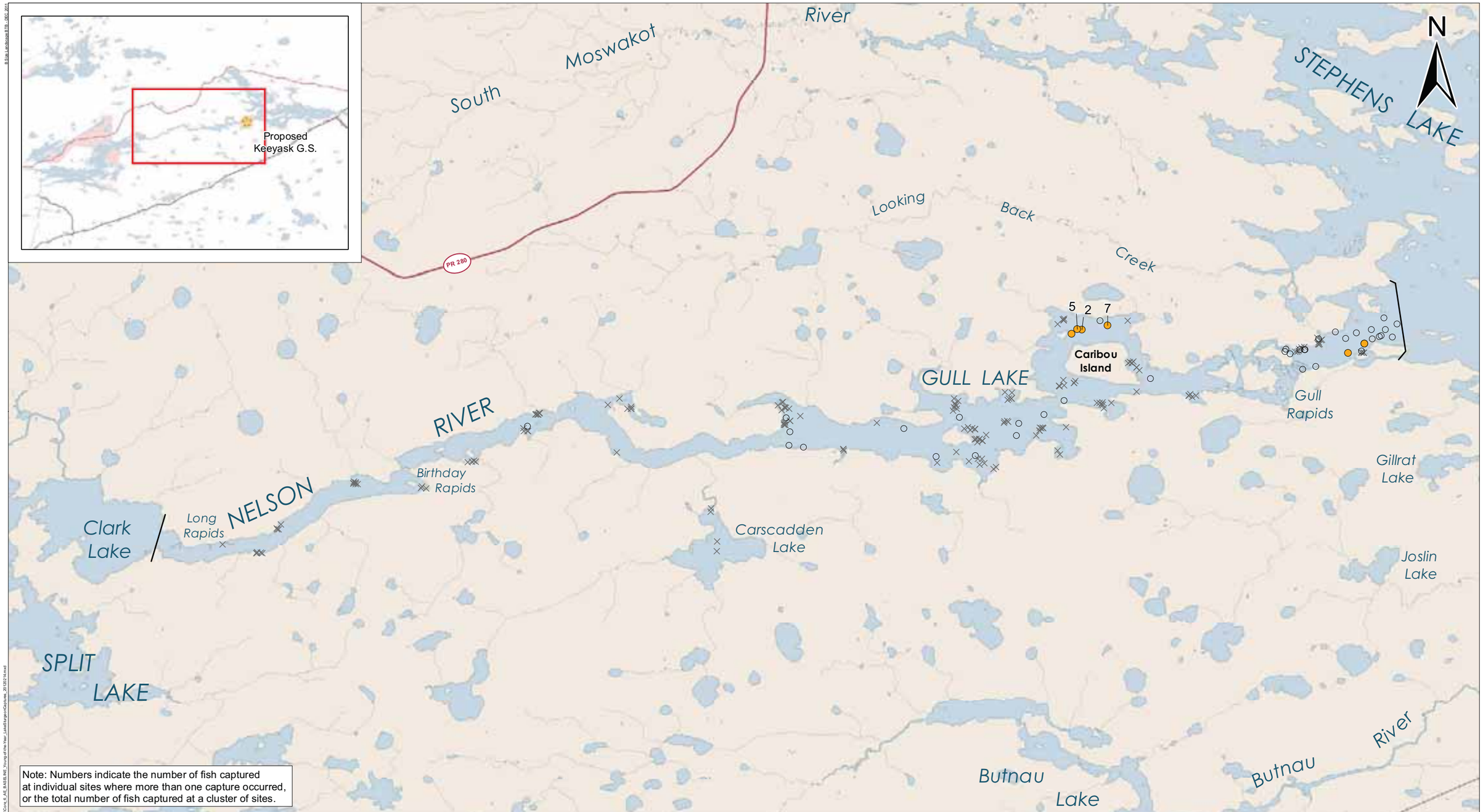
- < 25
- 26 - 99
- > 100

Clark Lake to Stephens Lake Area Boundary

Note: Shows 95th percentile inflow.

Lake Whitefish Habitat
Existing Environment

Map 6-23



Note: Numbers indicate the number of fish captured at individual sites where more than one capture occurred, or the total number of fish captured at a cluster of sites.

KEEYASK
Hydropower Limited Partnership

DATA SOURCE:
North/South Consultants, Government of Canada
Topo_50k_CanVec_Hydrography_Permanent_Seamless

CREATED BY:
North/South Consultants

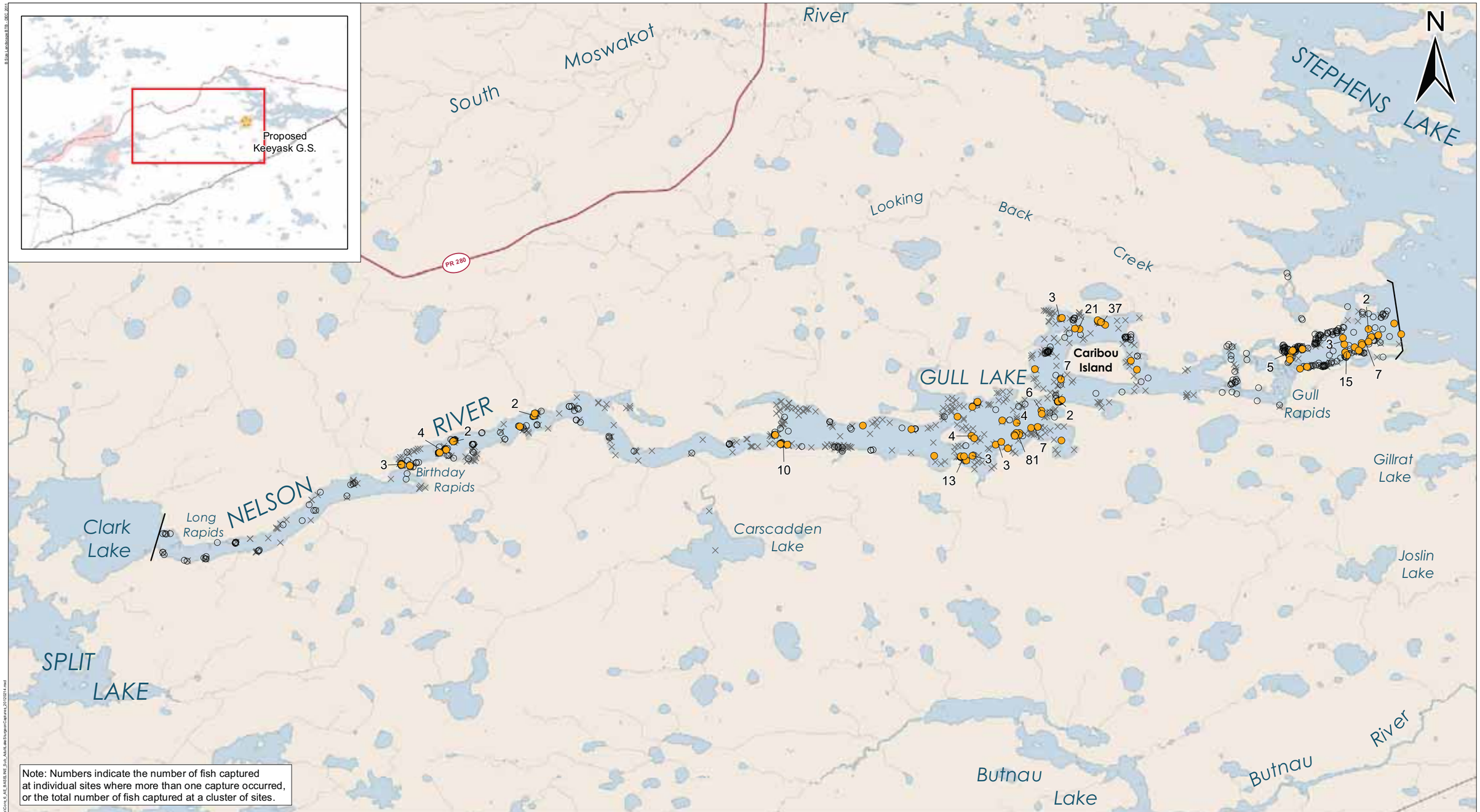
COORDINATE SYSTEM:	DATE CREATED:	REVISION DATE:
UTM NAD 1983 Z15N	26-MAR-10	28-MAY-12
0 1.5 3 Kilometres / 0 1 2 Miles	VERSION NO: 3.0	QA/QC: APPROVED

Legend

- Young-of-the-Year Lake Sturgeon Gillnet Captures
- Lake Sturgeon Gillnet Sites
- Index Gillnet Sites
- Clark Lake to Stephens Lake Area Boundary

Young-of-the-Year Lake Sturgeon Captures

Map 6-24



KEEYASK Hydropower Limited Partnership

DATA SOURCE:
North/South Consultants, Government of Canada
Topo_50k_CanVec_Hydrography_Permanent_Seamless

CREATED BY:
North/South Consultants

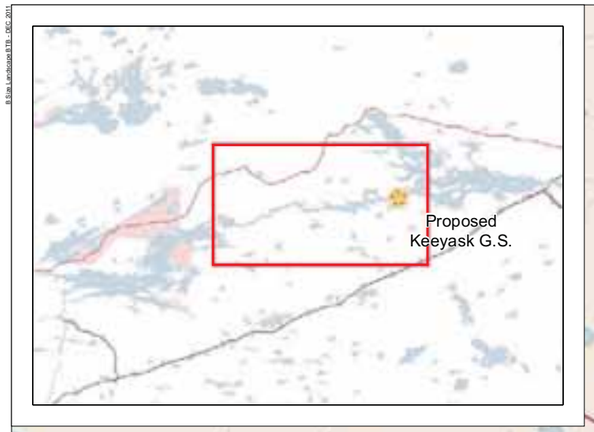
COORDINATE SYSTEM:	DATE CREATED:	REVISION DATE:
UTM NAD 1983 Z15N	26-MAR-10	28-MAY-12
0 1.5 3 Kilometres / 0 1 2 Miles	VERSION NO: 3.0	QA/QC: APPROVED

Legend

- Sub-Adult Lake Sturgeon Gillnet Captures
- Lake Sturgeon Gillnet Sites
- Index or Tagging Gillnet Sites
- Clark Lake to Stephens Lake Area Boundary

Sub-Adult Lake Sturgeon Captures

Map 6-25



Note: Numbers indicate the number of fish captured at individual sites where more than one capture occurred, or the total number of fish captured at a cluster of sites.

KEEYASK Hydropower Limited Partnership

DATA SOURCE:
North/South Consultants, Government of Canada
Topo_50k_CanVec_Hydrography_Permanent_Seamless

CREATED BY:
North/South Consultants

COORDINATE SYSTEM:	DATE CREATED:	REVISION DATE:
UTM NAD 1983 Z15N	26-MAR-10	28-MAY-12
0 1.5 3 Kilometres / 0 1 2 Miles	VERSION NO: 3.0	QA/QC: APPROVED

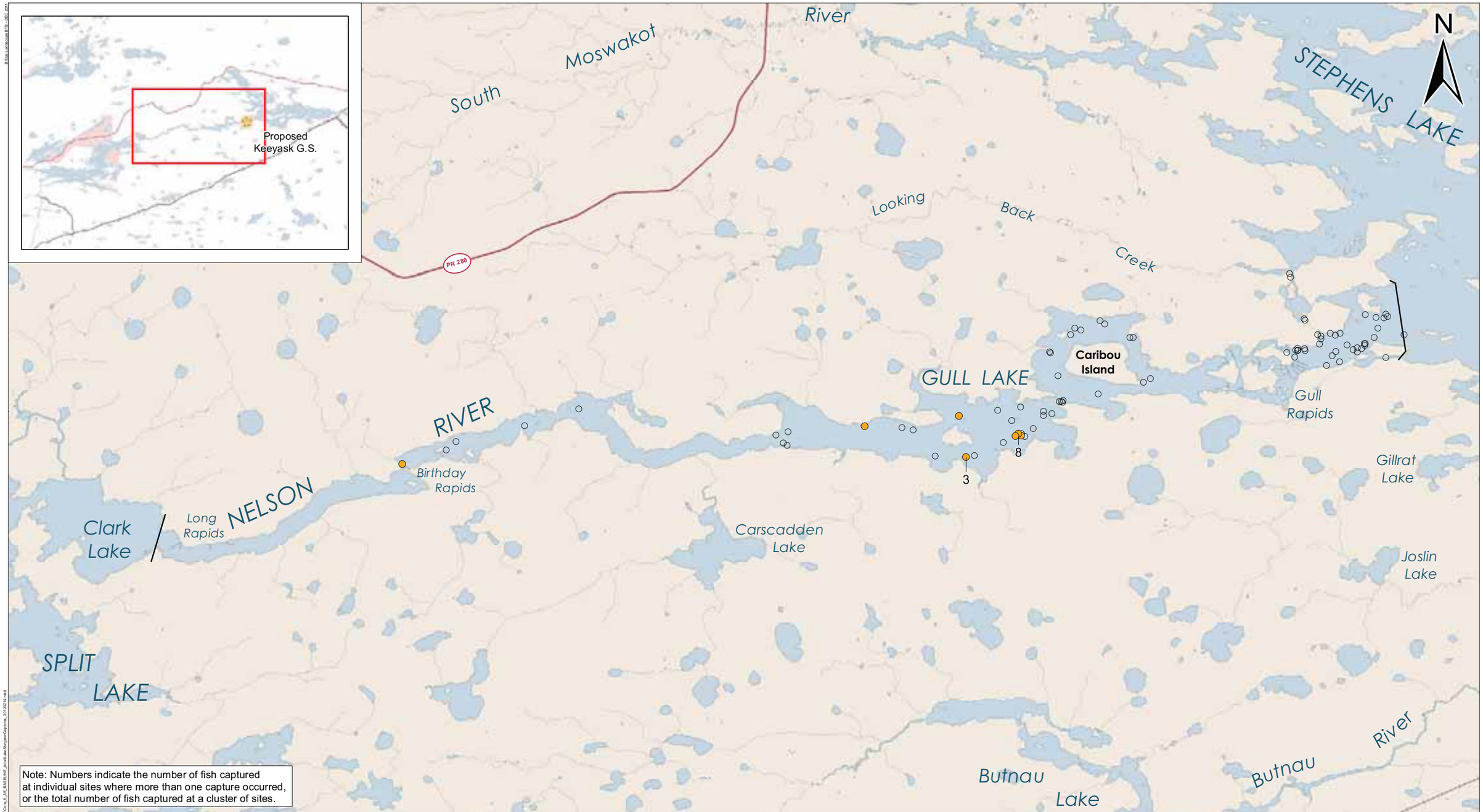
Legend

- Adult Lake Sturgeon Gillnet Captures
- Lake Sturgeon Gillnet Sites
- Clark Lake to Stephens Lake Area Boundary

Adult Lake Sturgeon Captures
Spring

Map 6-26

File Location: G:\EIS\Keyask\Publish_MXDs\CORE_VOLUME 6\...\Updated_Templates\Core_6_AE_BASELINE_Adult Lake Sturgeon\Capture\Spring_20120214.mxd



Note: Numbers indicate the number of fish captured at individual sites where more than one capture occurred, or the total number of fish captured at a cluster of sites.

KEEYASK
Hydropower Limited Partnership

DATA SOURCE:
North/South Consultants, Government of Canada
Topo_50k_CanVec_Hydrography_Permanent_Seamless

CREATED BY:
North/South Consultants

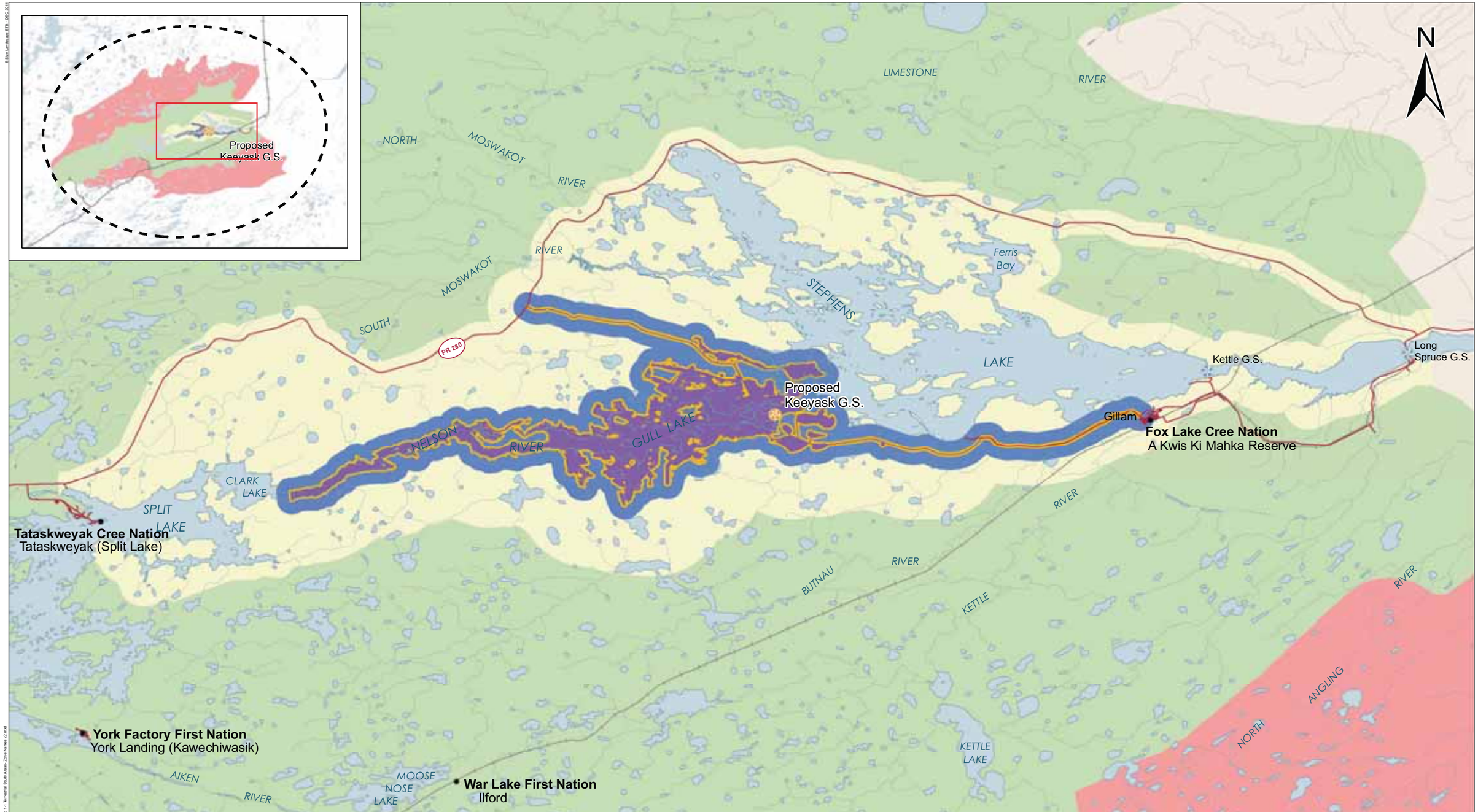
COORDINATE SYSTEM:	DATE CREATED:	REVISION DATE:
UTM NAD 1983 Z15N	26-MAR-10	28-MAY-12
0 1.5 3 Kilometres / 0 1 2 Miles	VERSION NO: 3.0	QA/QC: APPROVED

Legend

- Adult Lake Sturgeon Gillnet Captures
- Lake Sturgeon Gillnet Sites
- Clark Lake to Stephens Lake Area Boundary

Adult Lake Sturgeon Captures
Summer/Fall

Map 6-27



KEEYASK Hydropower Limited Partnership

DATA SOURCE:
Study areas - ECOSTEM Ltd.; Water - NTS; Roads and rail - Manitoba Conservation.

CREATED BY:
ECOSTEM Ltd.

COORDINATE SYSTEM:	DATE CREATED:	REVISION DATE:
UTM NAD 1983 Z15N	13-MAR-12	18-MAY-12
0 2.5 5 Kilometres / 0 3 6 Miles	VERSION NO: 1.0	QA/QC: APPROVED

Legend

Geographic Zones

- Study Zone 1 (Project Footprint for Both Phases)
- Study Zone 2
- Study Zone 3
- Study Zone 4
- Study Zone 5
- Study Zone 6

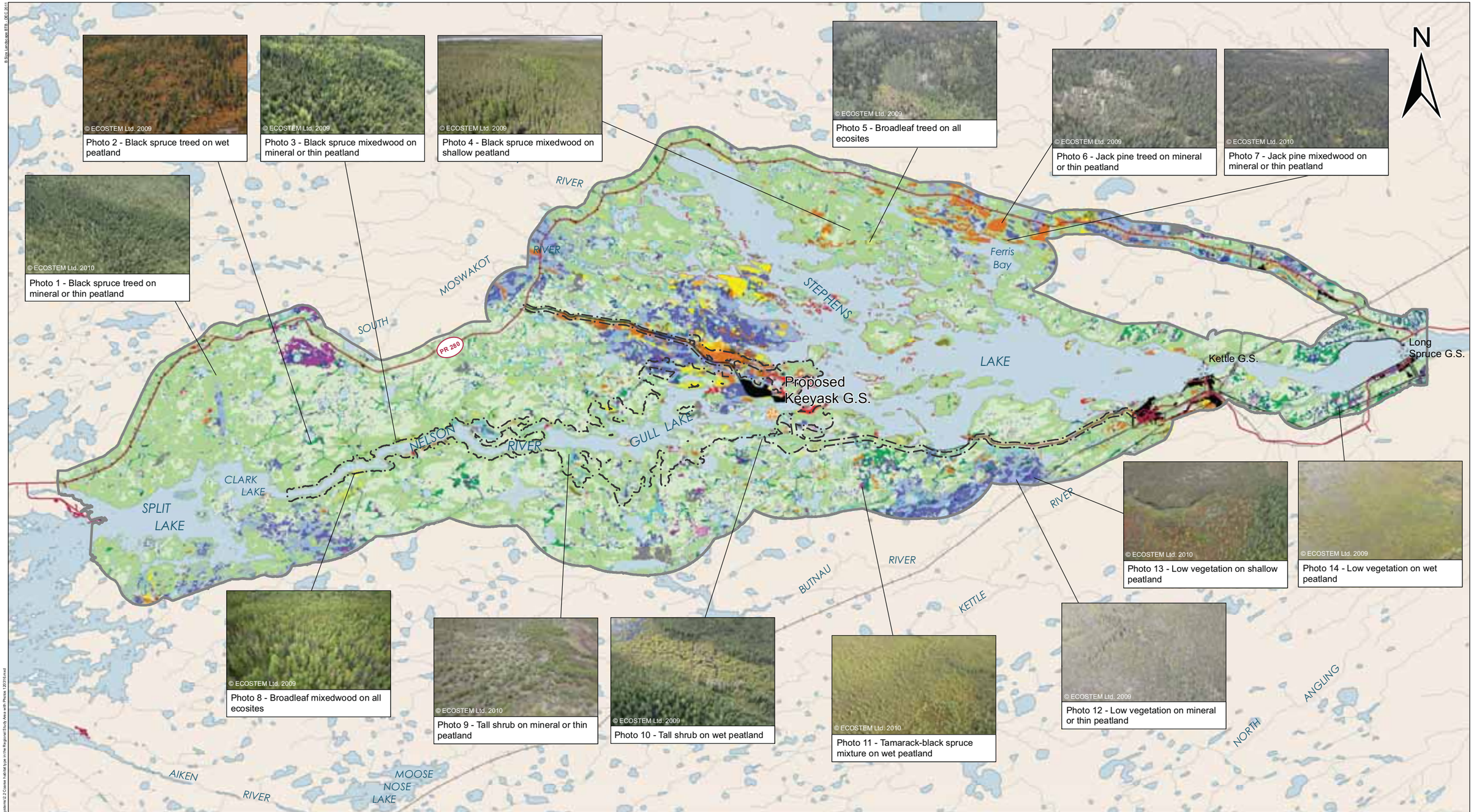
Project Areas

- Keeyask Generation Project Area

Note: Each zone includes all of the smaller zones within its perimeter

Geographic Zones Used for Terrestrial Study Areas

Map 6-28



KEEYASK Hydropower Limited Partnership

DATA SOURCE:
Study areas, habitat data and Nelson River shoreline - ECOSTEM Ltd.; Water - NTS; Roads and rail - Manitoba Conservation.

CREATED BY:
ECOSTEM Ltd.

COORDINATE SYSTEM:	DATE CREATED:	REVISION DATE:
UTM NAD 1983 Z15N	20-MAR-12	18-MAY-12
0 2.5 5 Kilometres / 0 3 6 Miles	VERSION NO: 1.0	QA/QC: APPROVED

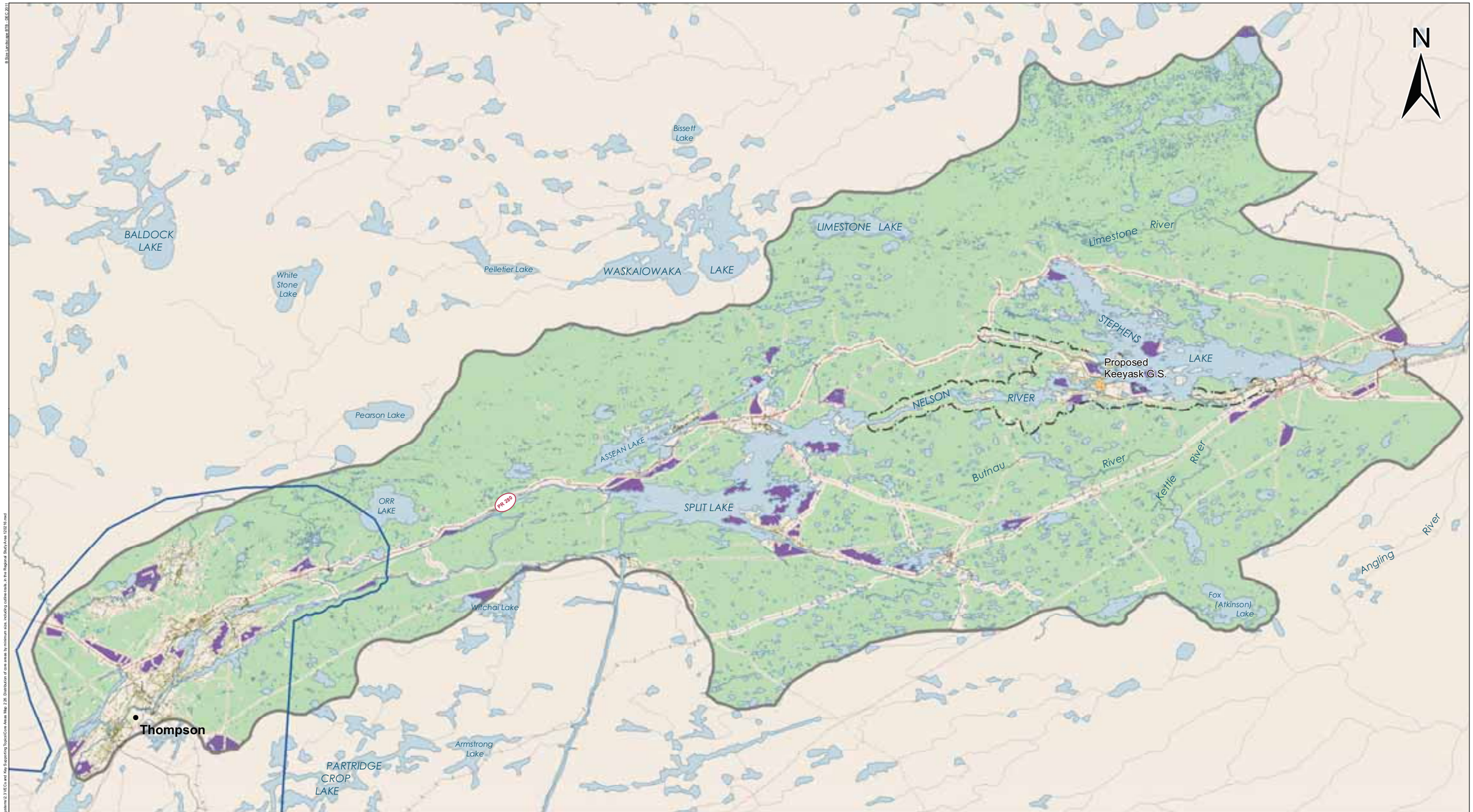
Legend

- Broadleaf Treed on All Ecosites
- Broadleaf Mixedwood on All Ecosites
- Black Spruce Treed on Mineral or Thin Peatland
- Black Spruce Treed on Shallow Peatland
- Black Spruce Treed on Wet Peatland
- Black Spruce Treed on Riparian Peatland
- Black Spruce Mixedwood on Mineral or Thin Peatland
- Black Spruce Mixedwood on Shallow Peatland
- Jack Pine Treed on Mineral or Thin Peatland
- Jack Pine Treed on Shallow Peatland
- Jack Pine Mixedwood on Mineral or Thin Peatland
- Low Vegetation on Mineral or Thin Peatland
- Low Vegetation on Shallow Peatland
- Low Vegetation on Wet Peatland
- Marsh
- Shrub /Low Vegetation on Ice Scour -Mineral
- Shrub /Low Vegetation on Riparian Peatland
- Tall Shrub on Mineral or Thin Peatland
- Tall Shrub on Shallow Peatland
- Tall Shrub on Wet Peatland
- Tamarack Treed on Shallow Peatland
- Tamarack Treed on Wet Peatland
- Tamarack Treed on Riparian Peatland
- Tamarack-Black Spruce Mixture on Wet Peatland
- Tamarack-Black Spruce Mixture on Riparian Peatland
- Unclassified Burn
- Water
- Permanent Human Footprint
- Habitat Local Study Area
- Study Zone 4

Coarse Habitat
In Study Zone 4

Map 6-29

File Location: Z:\Workspace\Keeyask GIS\EIS\Figures\Terrestrial\2 Habitat & Ecosystems\2-2 Coarse habitat type in the Regional Study Area with Photos 120315.mxd
© Stantec Consulting Ltd. 2011



KEEYASK Hydropower Limited Partnership

DATA SOURCE:
Core areas, linear features and Nelson River shoreline - ECOSTEM Ltd.; Roads - Manitoba Conservation; Transmission lines - Manitoba Hydro; Water and rail - NTS.

CREATED BY:
ECOSTEM Ltd.

COORDINATE SYSTEM:	DATE CREATED:	REVISION DATE:
UTM NAD 1983 Z15N	13-MAR-12	04-APR-12
0 5 10 Kilometres / 0 4 8 Miles	VERSION NO: 1.0	QA/QC: APPROVED

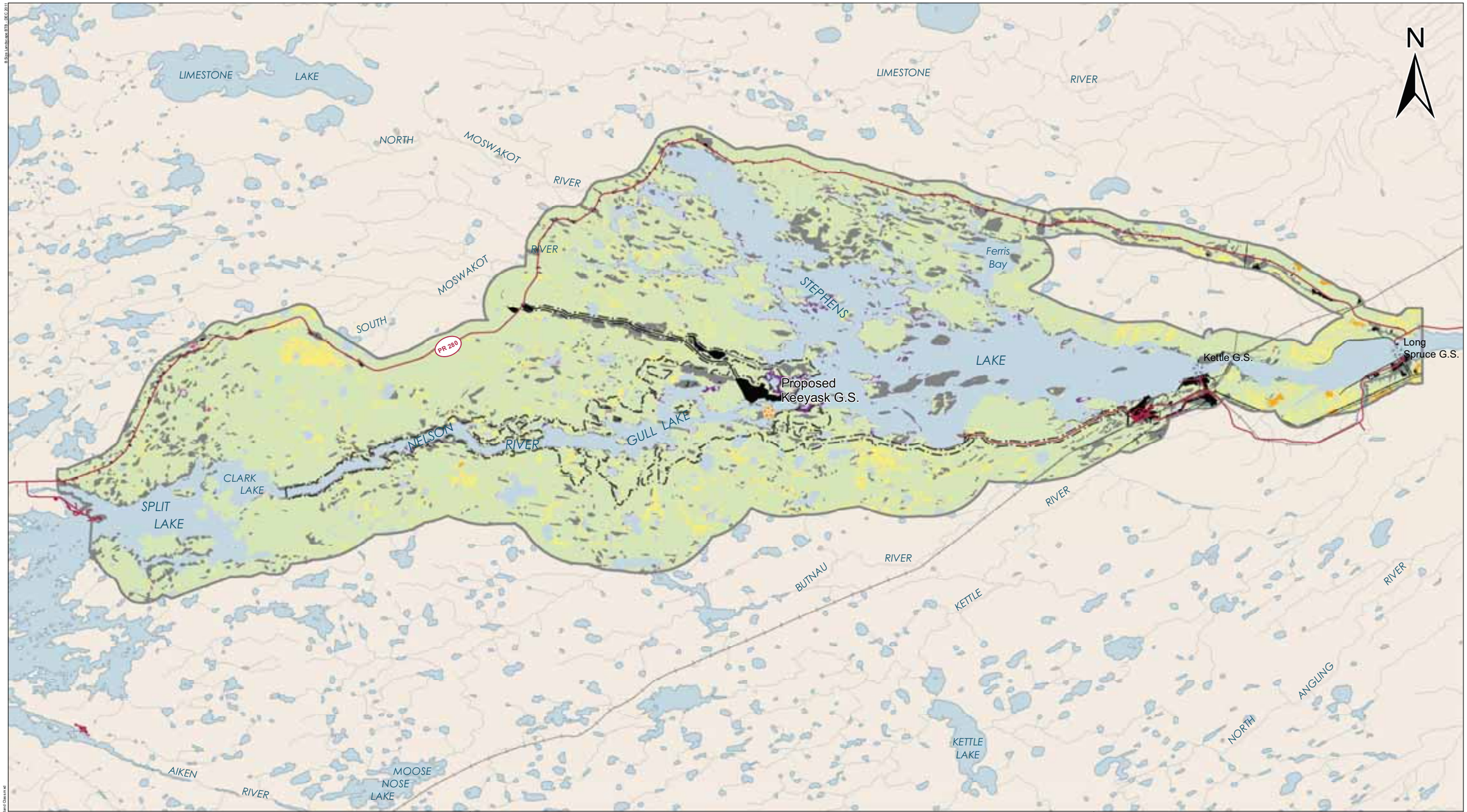
Legend

Core Areas and Linear Features

- 1,000 ha minimum size
- Additional core area when minimum size reduced to 200 ha
- Highway
- Road
- Winter Road
- Rail Line
- Transmission Line
- Dyke
- Cutline
- Ditch
- Path
- Intactness Local Study Area
- Intactness Regional Study Area
- Thompson Area

Linear Features and Core Areas

Map 6-30



KEEYASK
Hydropower Limited Partnership

DATA SOURCE:
Study areas, wetland class data and Nelson River shoreline - ECOSTEM Ltd.; Water - NTS; Roads and rail - Manitoba Conservation.

CREATED BY:
ECOSTEM Ltd.

COORDINATE SYSTEM:	DATE CREATED:	REVISION DATE:
UTM NAD 1983 Z15N	08-MAY-12	18-MAY-12
0 2 4 Kilometres / 0 3 6 Miles	VERSION NO: 1.0	QA/QC: APPROVED

Legend

Wetland Class
- Fen
- Swamp
- Bog
- Fen / Bog Mixture
- Marsh - Nelson River
- Marsh - Off System
- Shallow Water

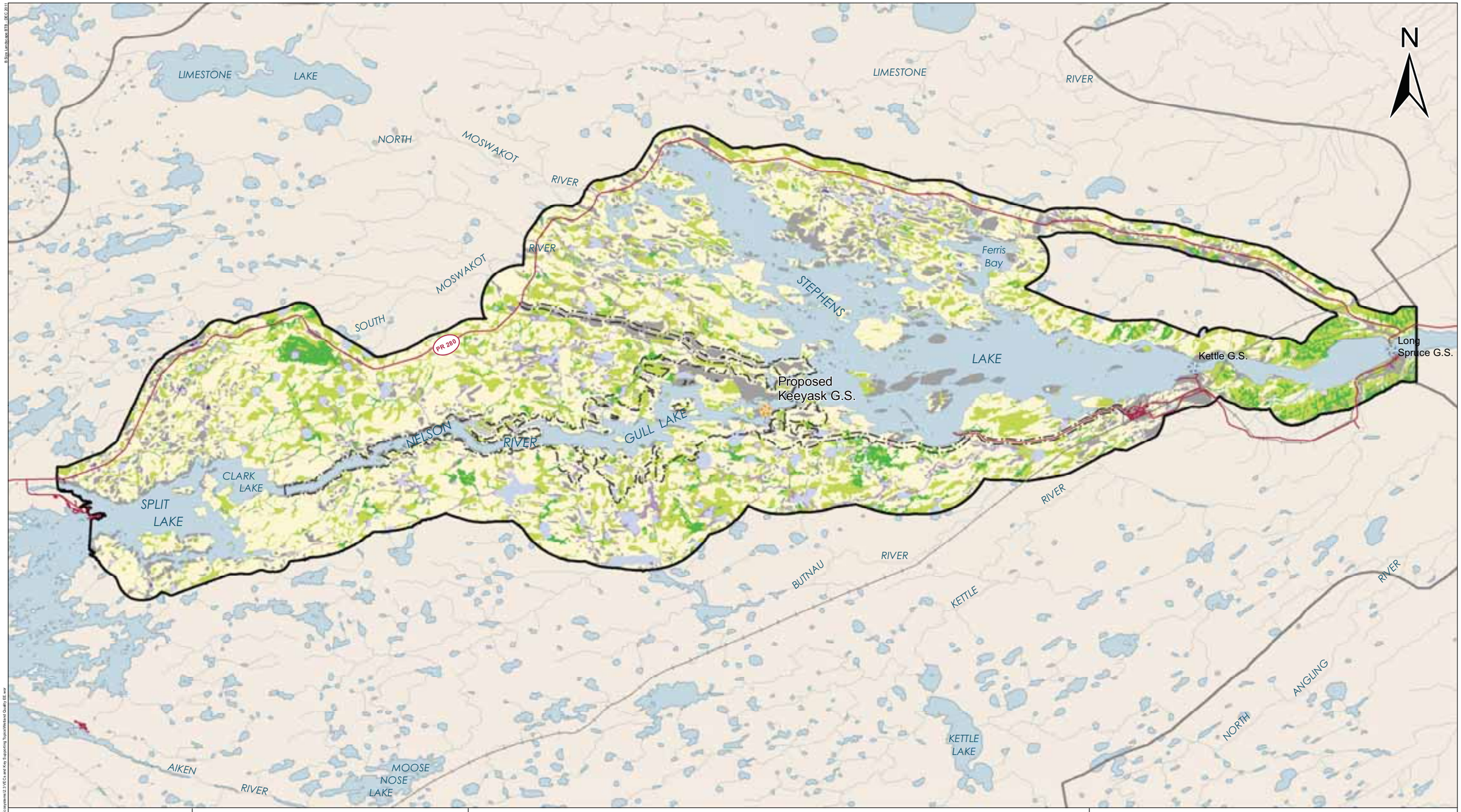
Other Terrestrial Areas
- Uplands
- Human

Study Areas
- Wetland Function Local Study Area
- Study Zone 4

Wetland Class

Map 6-31

File Location: Z:\Workspace\Keeyask GIS\Studies\Wetland Habitat\Mapping\Wetland Class.mxd



KEEYASK
Hydropower Limited Partnership

DATA SOURCE:
Study areas, wetland quality data and Nelson River shoreline - ECOSTEM Ltd.; Water - NTS; Roads and rail - Manitoba Conservation.

CREATED BY:
ECOSTEM Ltd.

COORDINATE SYSTEM:	DATE CREATED:	REVISION DATE:
UTM NAD 1983 Z15N	25-MAY-12	25-MAY-12
0 2.5 5 Kilometres / 0 3 6 Miles	VERSION NO: 1.0	QA/QC: APPROVED

Legend

Wetland Quality Score

- 60 - 69
- 50 - 59
- 40 - 49
- 30 - 39
- 20 - 29
- 10 - 19
- Uplands / Human Infrastructure

Study Areas

- Wetland Function Local Study Area
- Study Zone 4
- Wetland Function Regional Study Area

Note: Shallow water wetland class not assigned a wetland quality score for this map

Wetland Quality
in Study Zone 4

Map 6-32

LIMESTONE RIVER
Little Limestone Lake
Mile Twelve Creek
LIMESTONE RIVER
NORTH MOSWAKOT RIVER
MOSWAKOT RIVER SOUTH
STEPHENS LAKE
Ferris Bay
Sky Pilot Creek
PR 280
Looking Back Creek
Proposed Keeyask G.S.
Gull Rapids
NELSON RIVER
GULL LAKE
Birthday Rapids
Kettle G.S.
Long Spruce G.S.
Jasen River
FOX LAKE
CLARK LAKE
SPLIT LAKE
BUTNAU LAKE
BUTNAU RIVER
KETTLE RIVER
Little Kettle Lake
Kettle Lake
AIKEN RIVER
MOOSE NOSE LAKE
Cyril Lake
FOX (ATKINSON)
Brooks Creek

N

KEEYASK Hydropower Limited Partnership

DATA SOURCE:
Government of Manitoba, Manitoba Hydro, Stantec Consultants, NTS, Natural Resources Canada, Ecostem Ltd.

CREATED BY:
Stantec Consulting Ltd.

COORDINATE SYSTEM:	DATE CREATED:	REVISION DATE:
UTM NAD 1983 Z15N	11-OCT-11	18-MAY-12
0 4 8 Kilometres 0 3.5 7 Miles	VERSION NO: 1.0	QA/QC: APPROVED

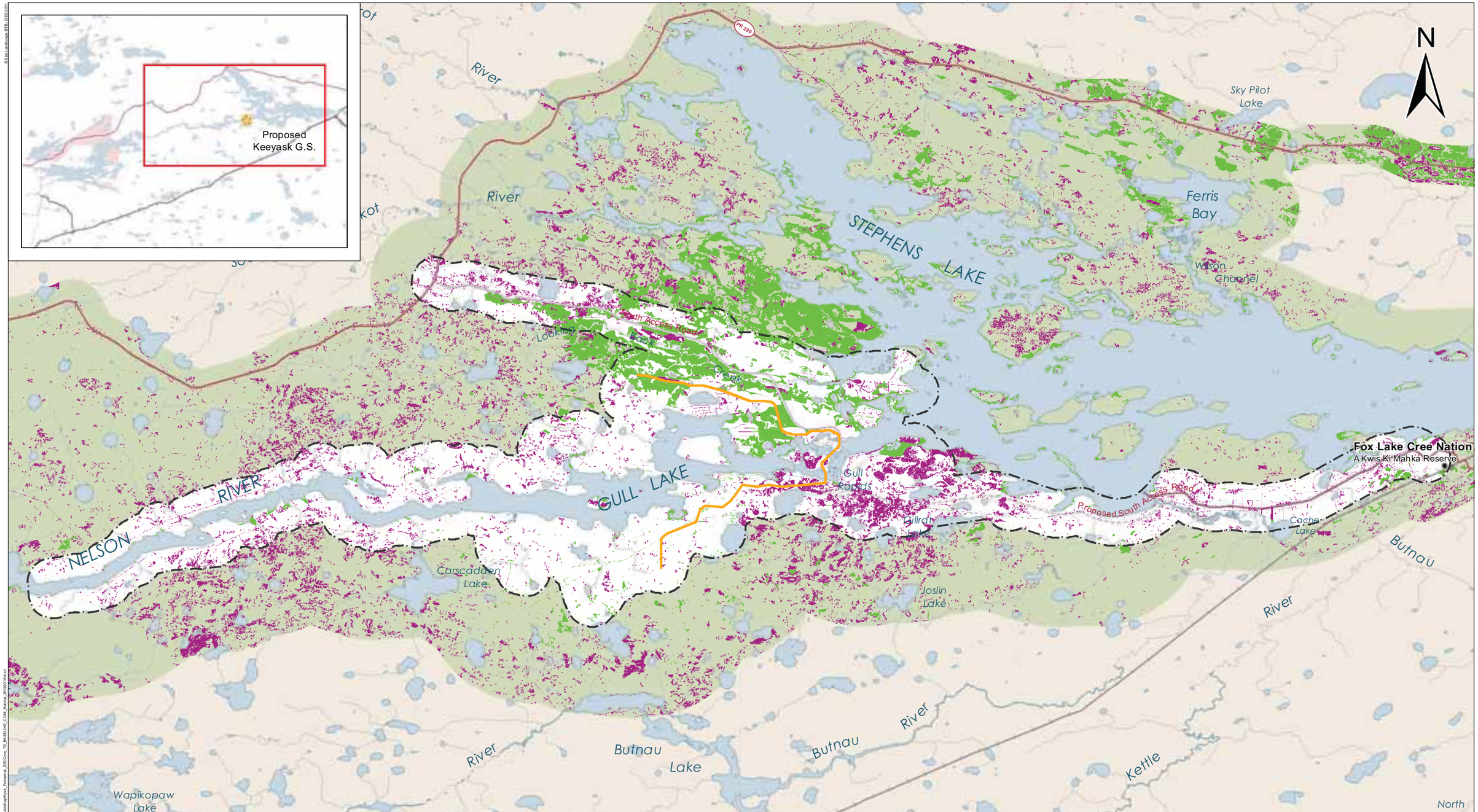
Legend

Gull and/or Tern Nesting Locations
- Gulls
- Gulls and / or Terns
- Terns

- Bird Local Study Area
- Bird Regional Study Area
- Generating Station (Planned)
- Generating Station (Existing)

Gull and Tern Nesting Locations

Map 6-33



KEEYASK
Hydropower Limited Partnership

DATA SOURCE:
Government of Manitoba, Manitoba Hydro, Stantec Consultants, NTS, Natural Resources Canada, Ecostem Ltd.

CREATED BY:
Stantec Consulting Ltd.

COORDINATE SYSTEM:	DATE CREATED:	REVISION DATE:
UTM NAD 1983 Z15N	16-MAR-12	05-APR-12
0 2 4 Kilometres / 0 1.5 3 Miles	VERSION NO: 1.0	QA/QC: APPROVED

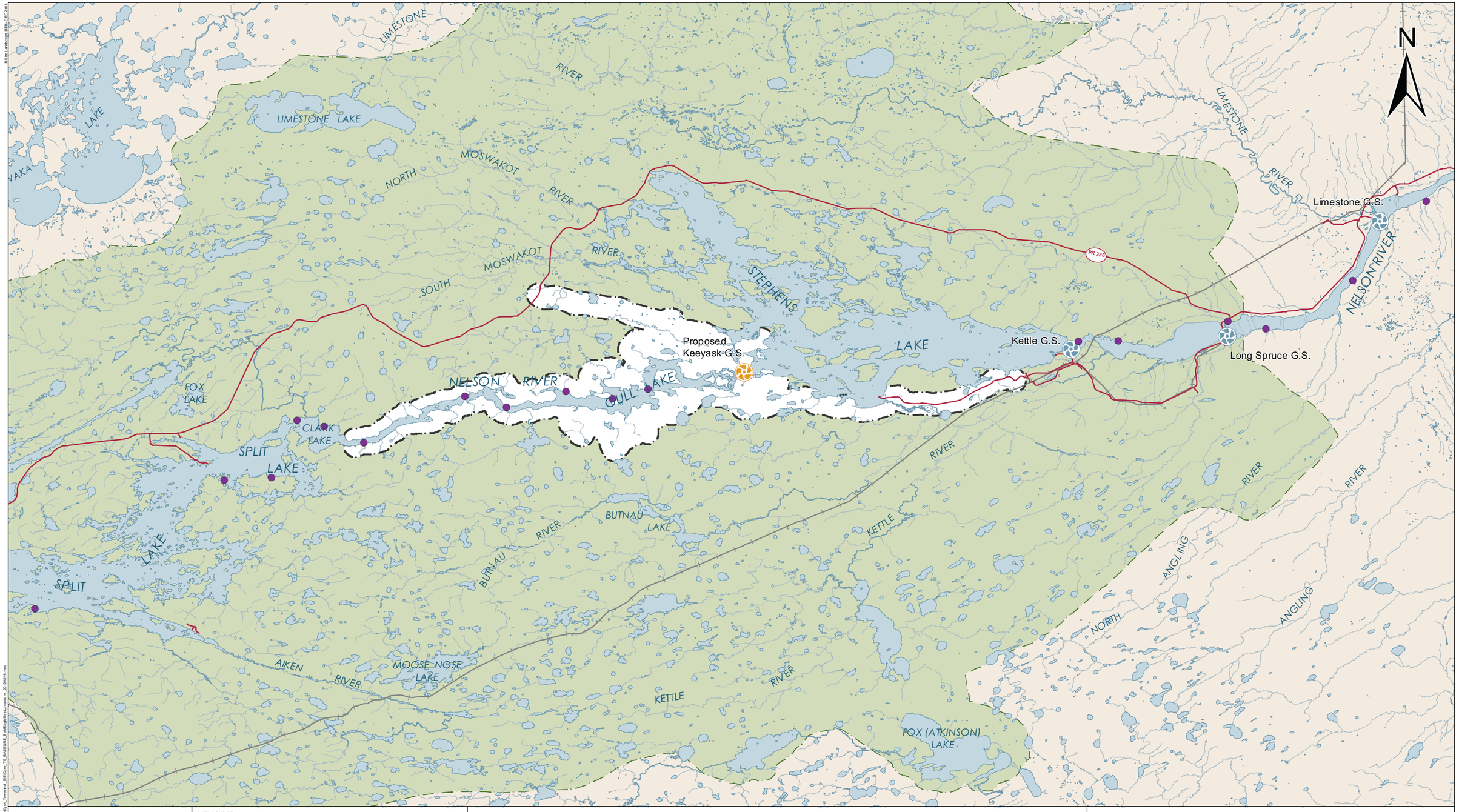
Legend

Common Nighthawk Habitat

- Primary Habitat
- Secondary Habitat
- Bird Local Study Area
- Bird Regional Study Area
- Proposed Access Road
- Access Road
- Keeyask Principal Structures

Common Nighthawk Breeding Habitat

Map 6-34



DATA SOURCE:
Government of Manitoba, Manitoba Hydro, Stantec Consultants, NTS, Natural Resources Canada, Ecostem Ltd.

CREATED BY:
Stantec Consulting Ltd.

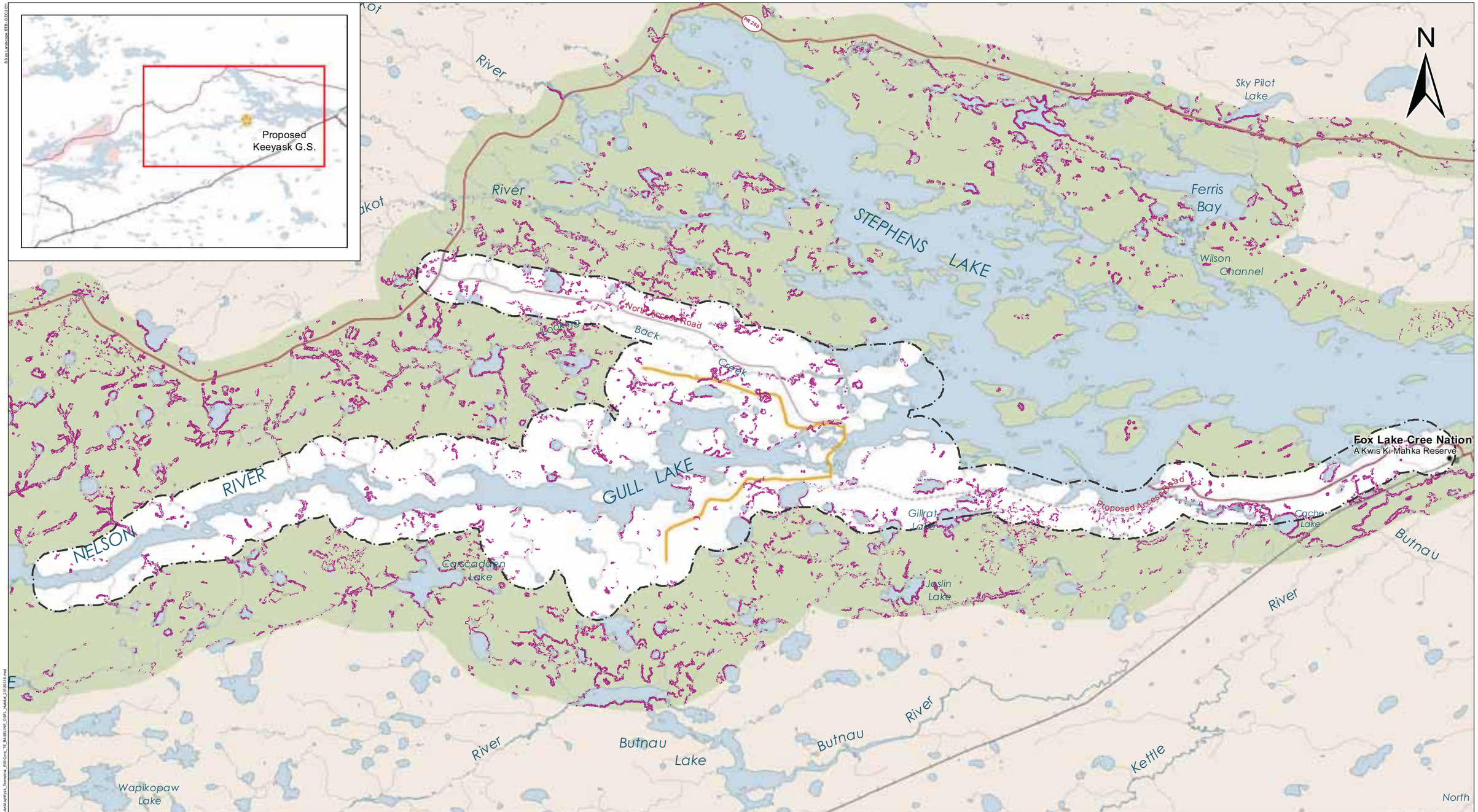
COORDINATE SYSTEM:	DATE CREATED:	REVISION DATE:
UTM NAD 1983 Z15N	11-OCT-11	18-MAY-12
0 5 10 Kilometres 0 3.5 7 Miles	VERSION NO: 1.0	QA/QC: APPROVED

Legend

- Bald Eagle Nest Location
- Bird Local Study Area
- Bald Eagle Regional Study Area
- Generating Station (Planned)
- Generating Station (Existing)

Bald Eagle Nest Locations

Map 6-35



KEEYASK
Hydropower Limited Partnership

DATA SOURCE:
Government of Manitoba, Manitoba Hydro, Stantec Consultants, NTS, Natural Resources Canada, Ecostem Ltd.

CREATED BY:
Stantec Consulting Ltd.

COORDINATE SYSTEM:	DATE CREATED:	REVISION DATE:
UTM NAD 1983 Z15N	16-MAR-12	24-MAY-12
0 2 4 Kilometres / 0 1.5 3 Miles	VERSION NO: 1.0	QA/QC: APPROVED

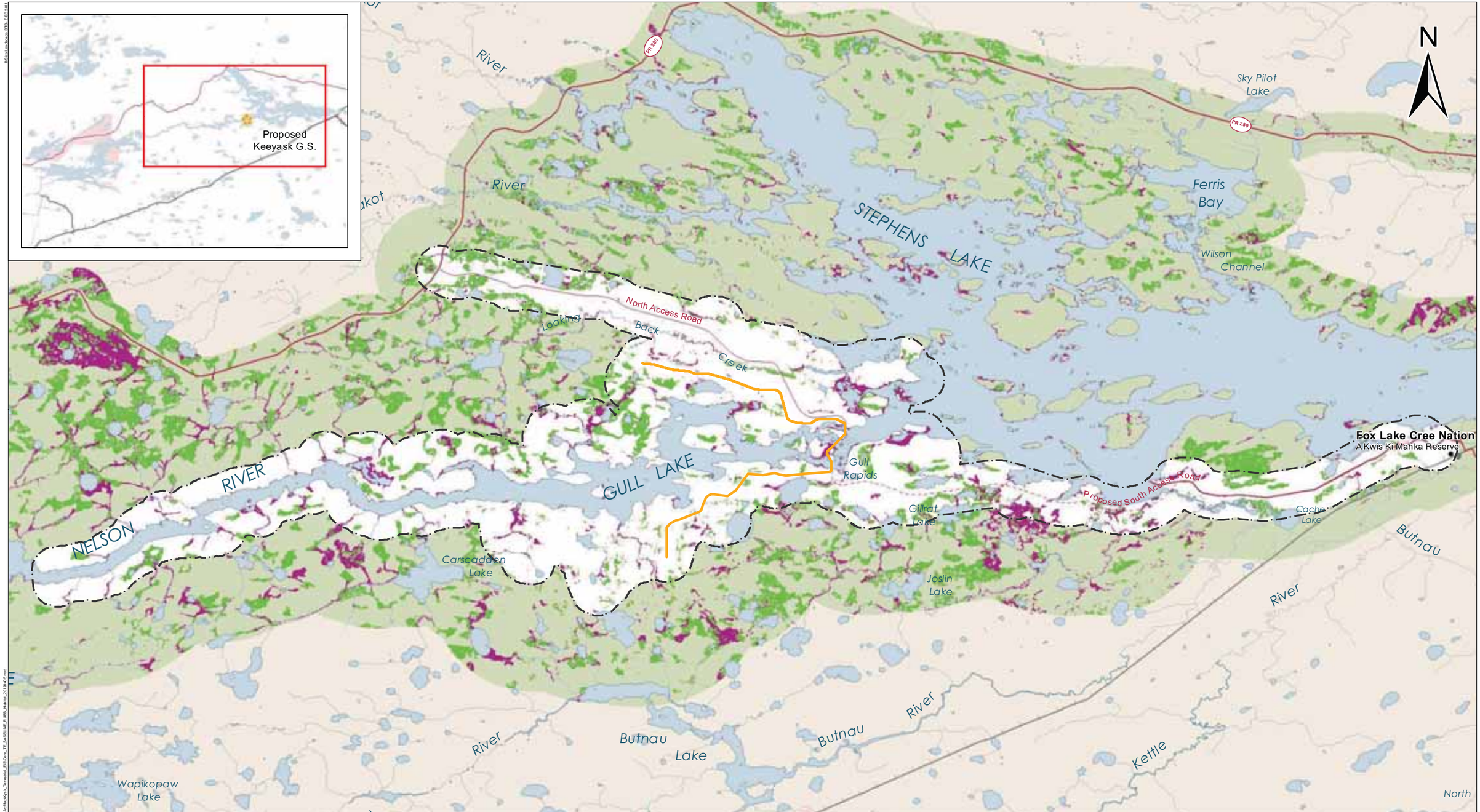
Legend

Olive-sided Flycatcher Habitat

- Primary Habitat
- Secondary Habitat (DN: in development)
- Bird Local Study Area
- Bird Regional Study Area
- Proposed Access Road
- Access Road
- Keeyask Principal Structures

Olive-sided Flycatcher Breeding Habitat

Map 6-36



KEEYASK
Hydropower Limited Partnership

DATA SOURCE:
Government of Manitoba, Manitoba Hydro, Stantec Consultants, NTS, Natural Resources Canada, Ecostem Ltd.

CREATED BY:
Stantec Consulting Ltd.

COORDINATE SYSTEM:	DATE CREATED:	REVISION DATE:
UTM NAD 1983 Z15N	16-MAR-12	05-APR-12
0 2 4 Kilometres / 0 1.5 3 Miles	VERSION NO: 1.0	QA/QC: APPROVED

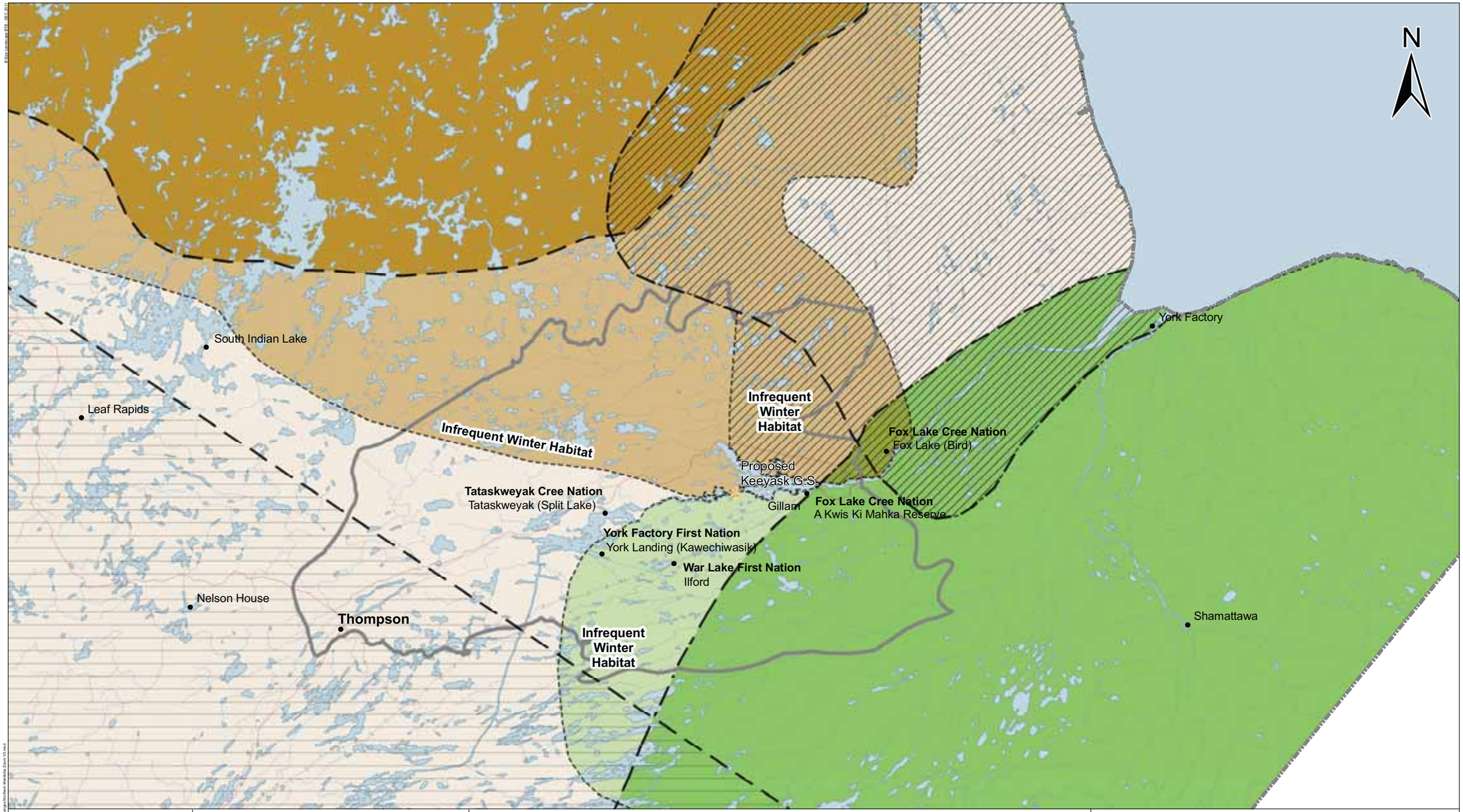
Legend

Rusty Blackbird Habitat

- Primary Habitat
- Secondary Habitat
- Bird Local Study Area
- Bird Regional Study Area
- Proposed Access Road
- Access Road
- Keeyask Principal Structures

Rusty Blackbird Breeding Habitat

Map 6-37



KEEYASK Hydropower Limited Partnership

DATA SOURCE:
Study areas - ECOSTEM Ltd.; Caribou ranges - Manitoba Conservation and Water Stewardship; Extended caribou habitat - Thompson and Abraham 1994, Beverly Qamanirjuaq Management Board, WRCS field studies/professional judgement; Roads, water and rail - NTS.

CREATED BY: ECOSTEM Ltd.

COORDINATE SYSTEM:	DATE CREATED:	REVISION DATE:
UTM NAD 1983 Z15N	23-MAR-12	18-MAY-12
0 10 20 Kilometres / 0 9 18 Miles	VERSION NO: 1.0	QA/QC: APPROVED

Legend

Provincial Caribou Ranges (Manitoba Conservation and Water Stewardship)
- Coastal - Cape Churchill
- Coastal - Pen Islands
- Barren Ground (Qamanirjuaq)
- Boreal Woodland Caribou

Study Areas
- Caribou Regional Study Area

Extended Infrequent Winter Caribou Habitat
- Coastal - Cape Churchill Infrequent Winter Habitat
- Coastal - Pen Islands Infrequent Winter Habitat
- Barren Ground (Qamanirjuaq) Infrequent Winter Habitat

Note: Extended habitat estimated from WRCS field studies (2001-2011) and Beverly Qamanirjuaq Management Board data.

Caribou Ranges

Map 6-38

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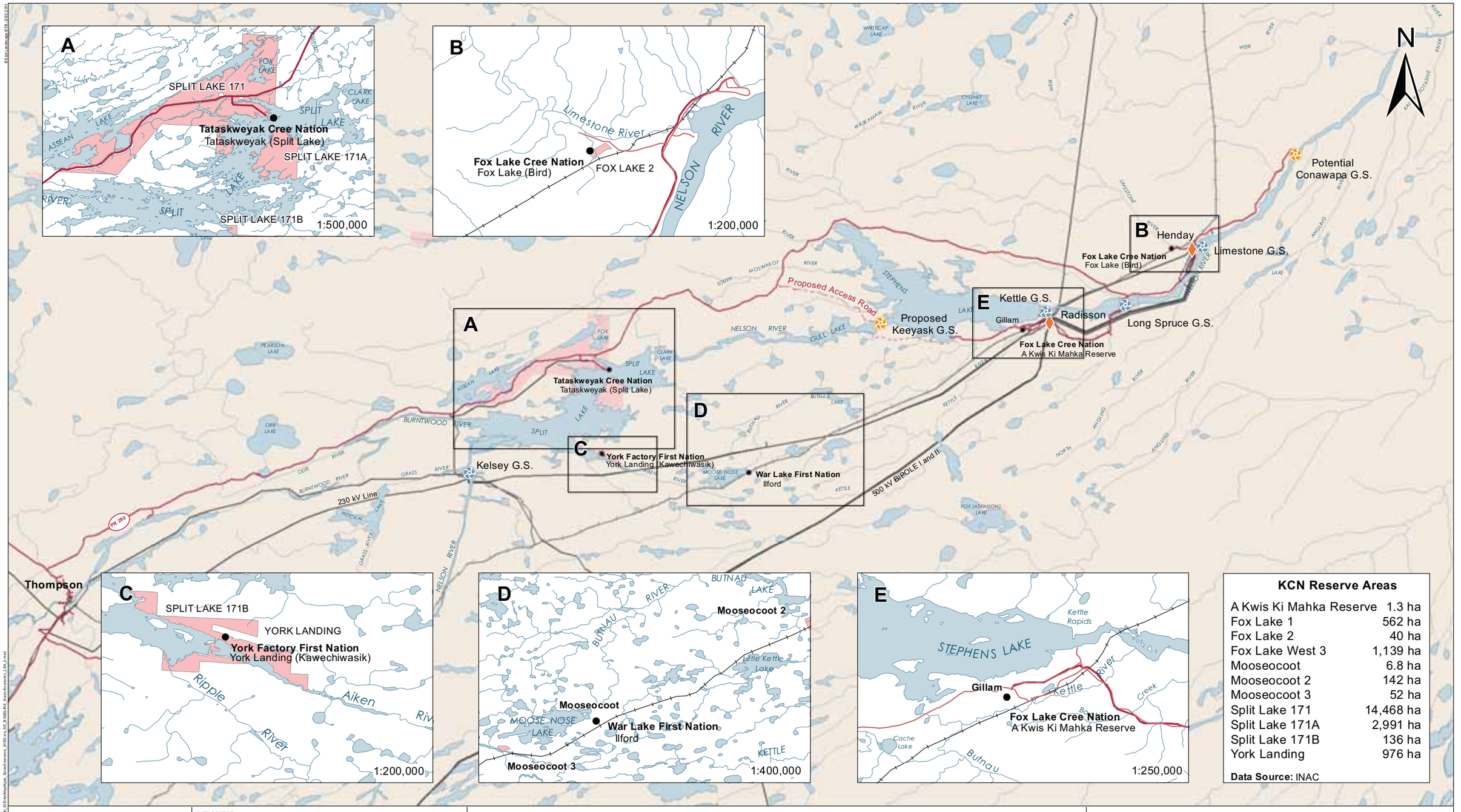
File Location: Z:\Workspace\Keeyask GIS\Support\Mammal\Caribou\Caribou Ranges\Northern Manitoba Zoom V3.mxd



KCN Reserve Areas

A Kwis Ki Mahka Reserve	1.3 ha
Fox Lake 1	562 ha
Fox Lake 2	40 ha
Fox Lake West 3	1,139 ha
Mooseocoot	6.8 ha
Mooseocoot 2	142 ha
Mooseocoot 3	52 ha
Split Lake 171	14,468 ha
Split Lake 171A	2,991 ha
Split Lake 171B	136 ha
York Landing	976 ha

Data Source: INAC

KEEYASK Hydropower Limited Partnership

DATA SOURCE: Manitoba Hydro, NTS, Stantec Consulting Ltd.

CREATED BY: Stantec Consulting Ltd.

COORDINATE SYSTEM:	DATE CREATED:	REVISION DATE:
UTM NAD 1983 Z15N	16-DEC-10	07-JUN-12
0 8.5 17 Kilometres / 0 7 14 Miles	VERSION NO: 1.0	QA/QC: APPROVED

Legend

- Generating Station (Planned)
- Generating Station (Existing)
- Converter Station
- First Nation Community
- Town/City
- Highway
- Proposed Access Road
- Rail
- Existing Transmission Line
- First Nation Reserve
- Waterbody

Communities depicted on the map are included in the Socio-Economic Local Study Area

Socio-Economic Local Study Area

Map 6-39