Appendix 4-LL

Aquatics Meeting - April 2020

NWP Coal Canada Ltd

Crown Mountain Coking Coal Project

Aquatics Meeting

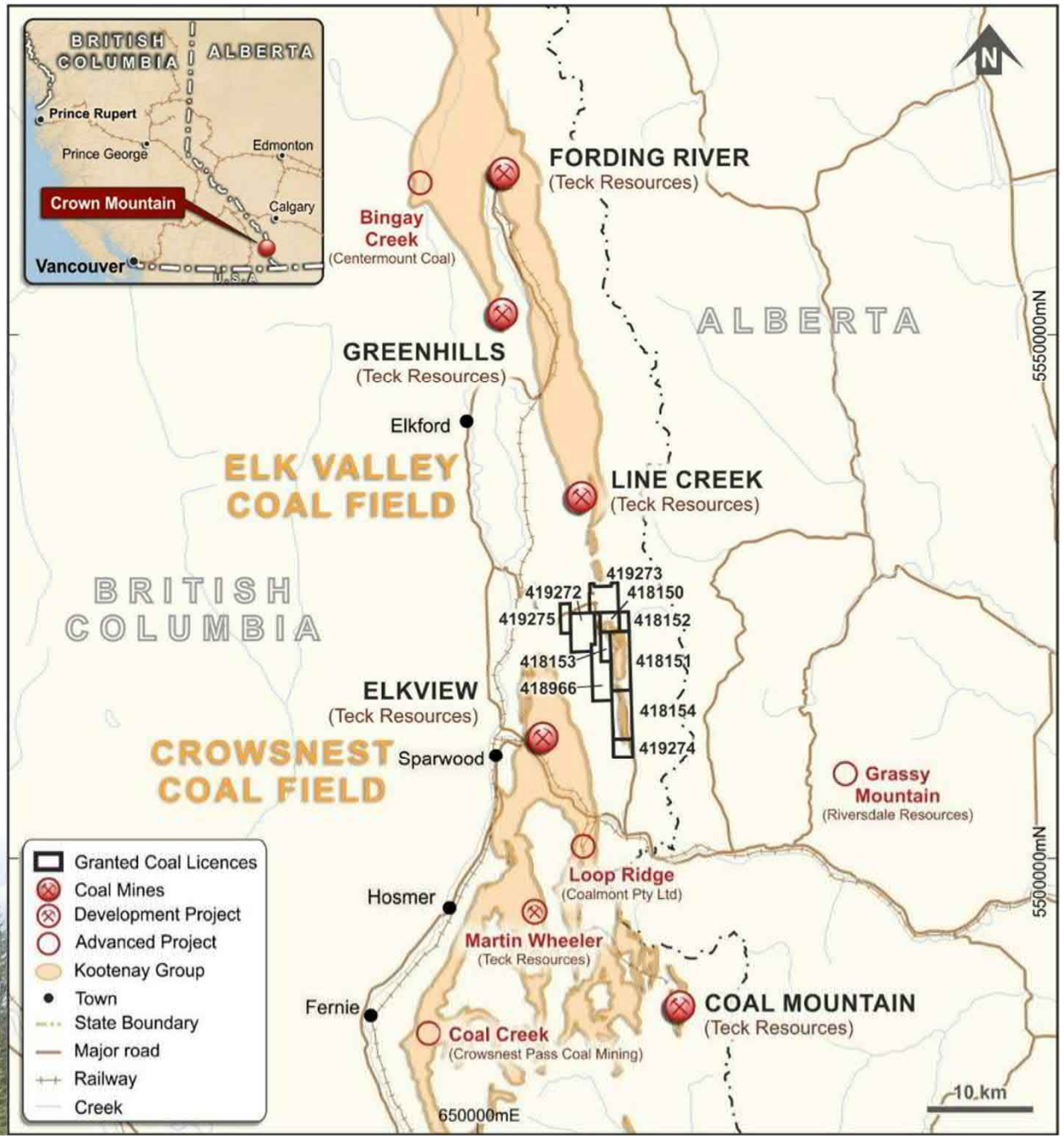
April 29, 2020

Presentation Format

1. Project Overview
2. Proposed Project Timelines
3. Study Areas
4. Aquatic Valued Components
5. Fish and Fish Habitat Overview
6. Key Findings
7. Effects Assessment
8. Offsetting Strategy
9. Questions / Discussion

NWP Coal Canada Ltd

Crown Mountain Project Location

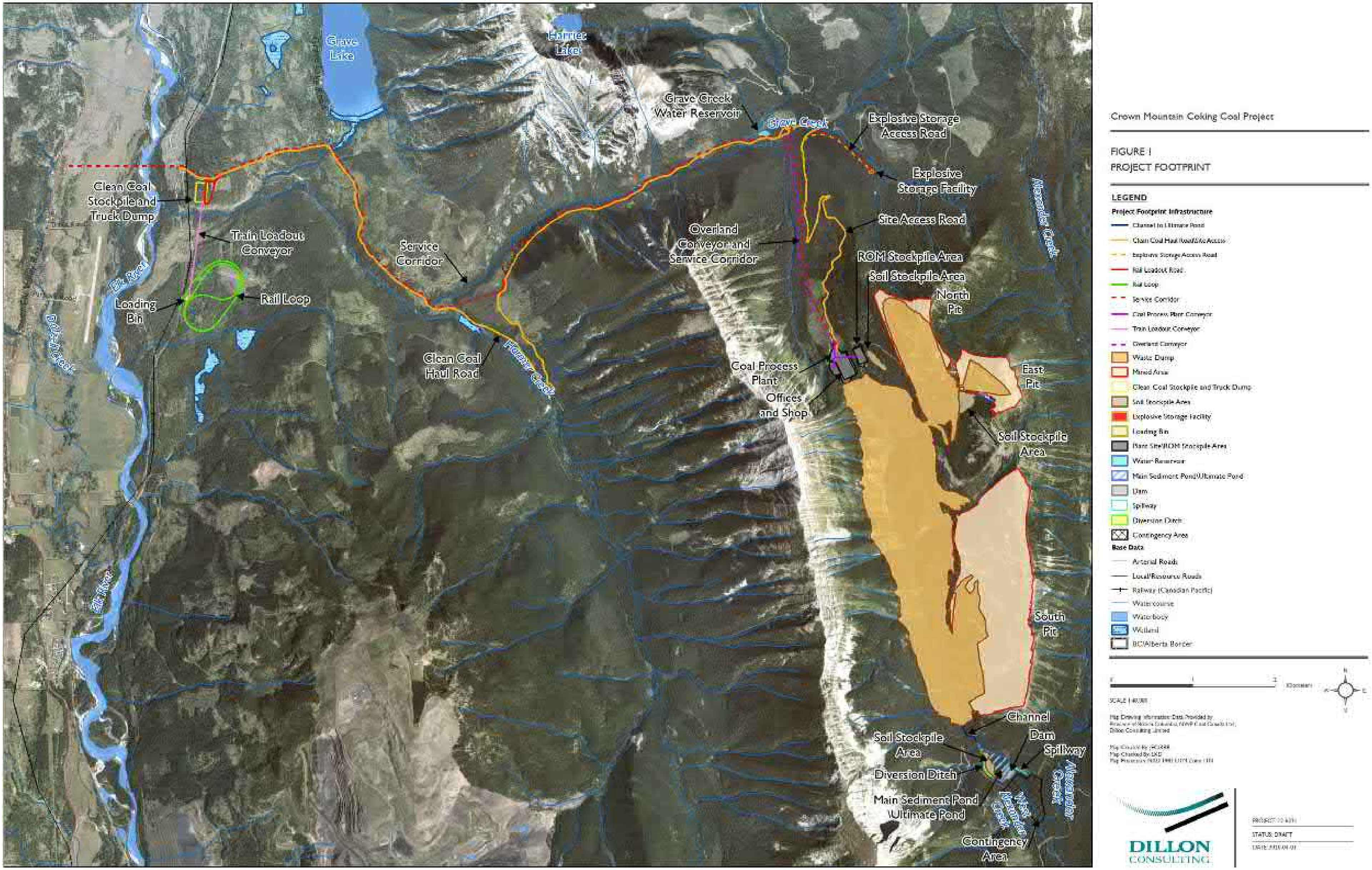


Project Overview

- Proposed open pit metallurgical coal mine in the Elk Valley
- 10 tenured coal exploration licenses (approx. 5,630 ha)
- Other nearby mines in Elk Valley include Teck's Elkview (8 km southwest) and Line Creek mines (12 km north)
- Anticipated production capacity of 3.7 million run-of-mine tonnes (M ROMt) per annum for 16 years (not including site decommissioning)
- Construction estimated at 1 to 1.5 years

Project Overview

- Key project components include (approximately 1,100 ha):
  - Surface extraction areas (three pits - north pit, east pit, and south pit)
  - Waste rock management areas
  - Plant area (includes raw coal stockpile, processing plant, site support facilities)
  - Clean coal transportation route (overland conveyor and haul road)
  - Rail load out facility and rail siding
  - Power and natural gas supply
  - Explosives and fuel storage
  - Sewage treatment
  - Water supply

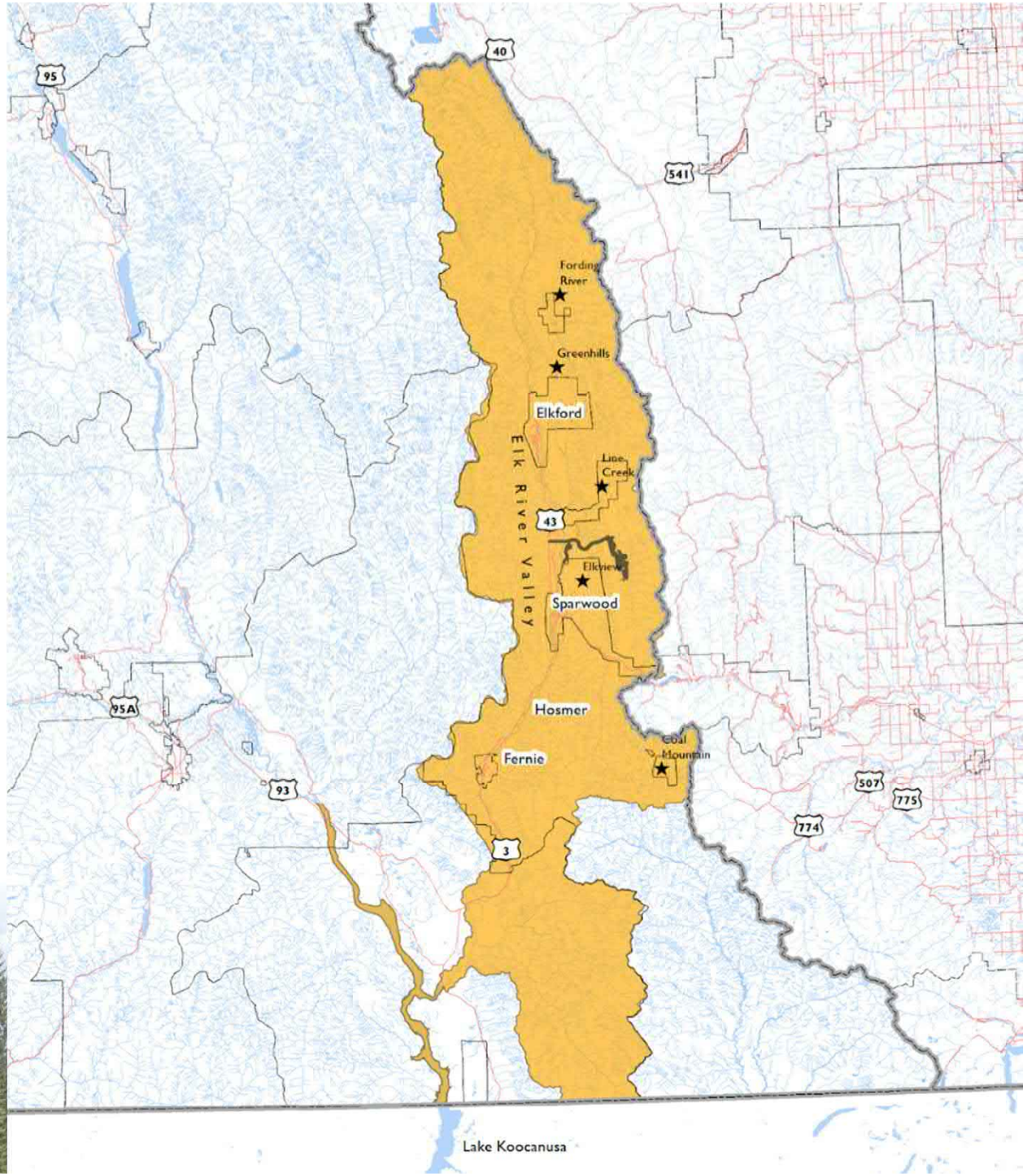

Grave Lake
Harriet Lake
Grave Creek Water Reservoir
Grave Creek
Explosive Storage Access Road
Explosive Storage Facility
Site Access Road
ROM Stockpile Area
Soil Stockpile Area
North Pit
East Pit
Soil Stockpile Area
South Pit
Clean Coal Stockpile and Truck Dump
Train Loadout Conveyor
Service Corridor
Overland Conveyor and Service Corridor
Loading Bin
Rail Loop
Elk River
Clean Coal Haul Road
Harmer Creek
Coal Process Plant
Offices and Shop
Alexander Creek
Channel
Dam
Spillway
Soil Stockpile Area
Diversion Ditch
Main Sediment Pond Ultimate Pond
Contingency Area
Crown Mountain Coking Coal Project
FIGURE 1
PROJECT FOOTPRINT
LEGEND
Project Footprint Infrastructure
Waste Dump
Clean Coal Stockpile and Truck Dump
Water Reservoir
Main Sediment Pond/Ultimate Pond
Contingency Area
Base Data
Railway (Canadian Pacific)
BC/Alberta Border
DILLON CONSULTING

Proposed Project Timelines

- EA Submission – Q3 2020
- EA Approval – Q4 2021
- Mine Permit Approval – Q1 2022
- Construction – Q2 2022
- Commissioning – Q2 2023
- Commercial Production – Q3 2023

Aquatic Regional Study Area

- Aquatic Regional Study Area
- Existing Operating Mines
- Highways/Major Roads
- Watercourses
- Project Footprint
- Lakes/Rivers
- Regional District/Municipal Boundaries
- BC/Alberta/USA Border



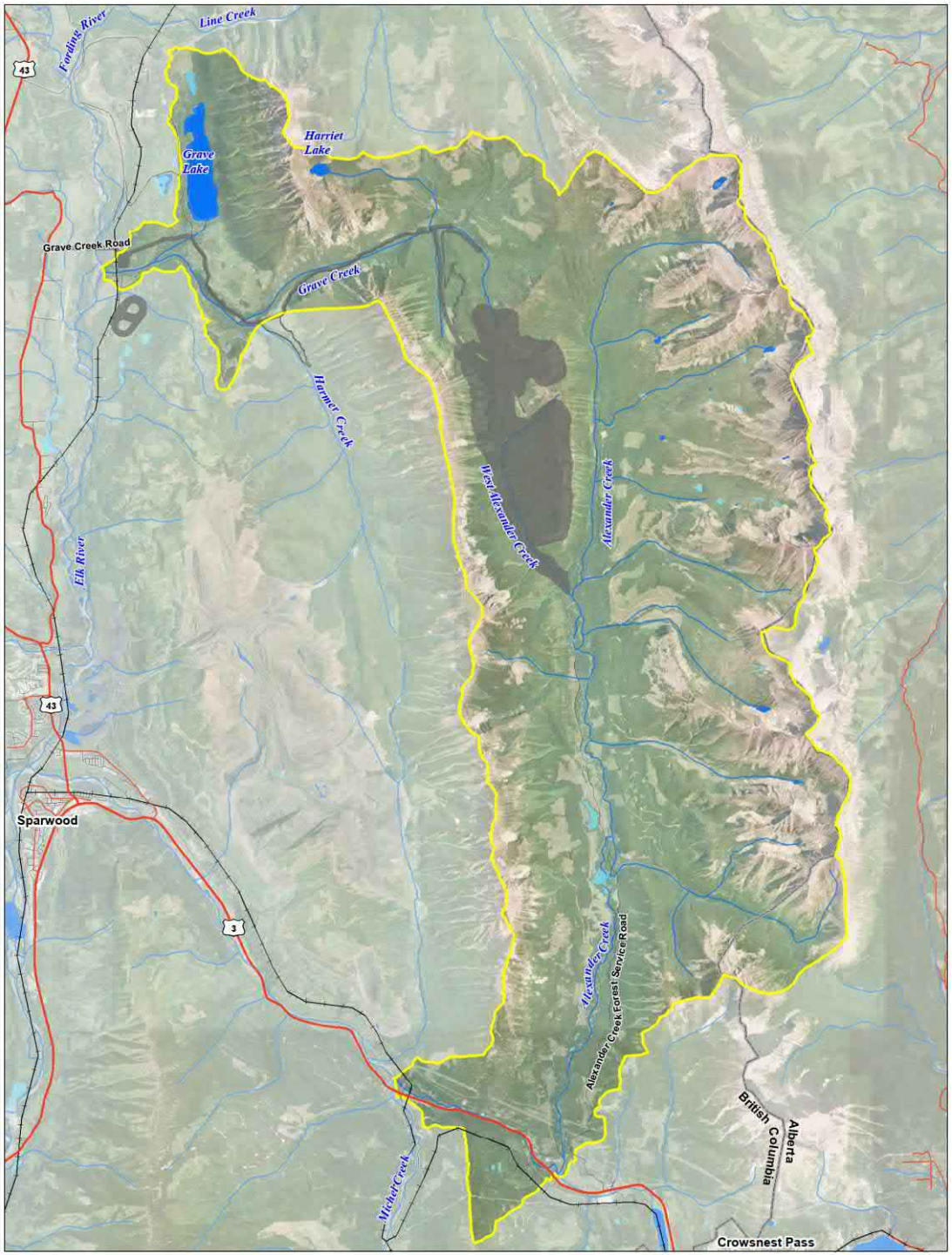
Aquatic Local Study Area

LEGEND

- BC/Alberta Border
- Provincial Park
- Local Study Area
- Project Footprint
- Waterbody
- Wetland
- Watercourse
- Highways
- Arterial Roads
- Local/Resource Roads
- Railway (Canadian Pacific)

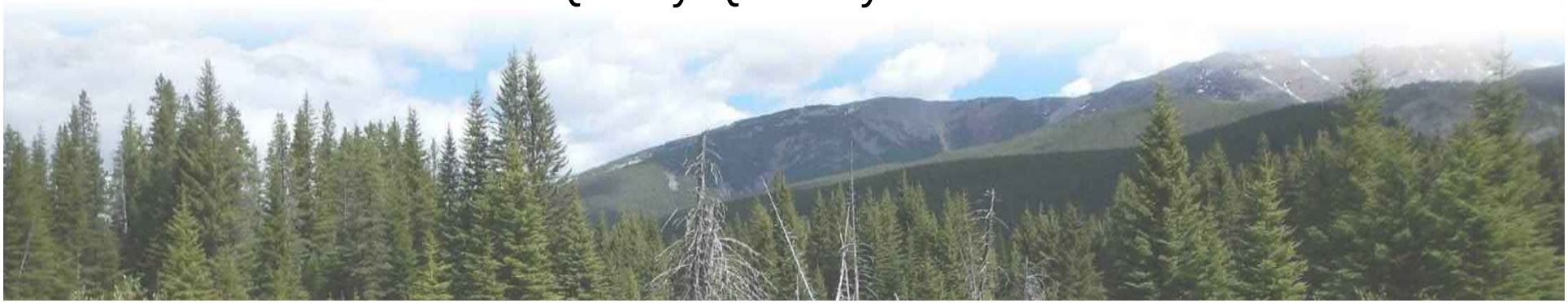
0 0.5 1 2 3 4 5 km

SCALE 1:82,000



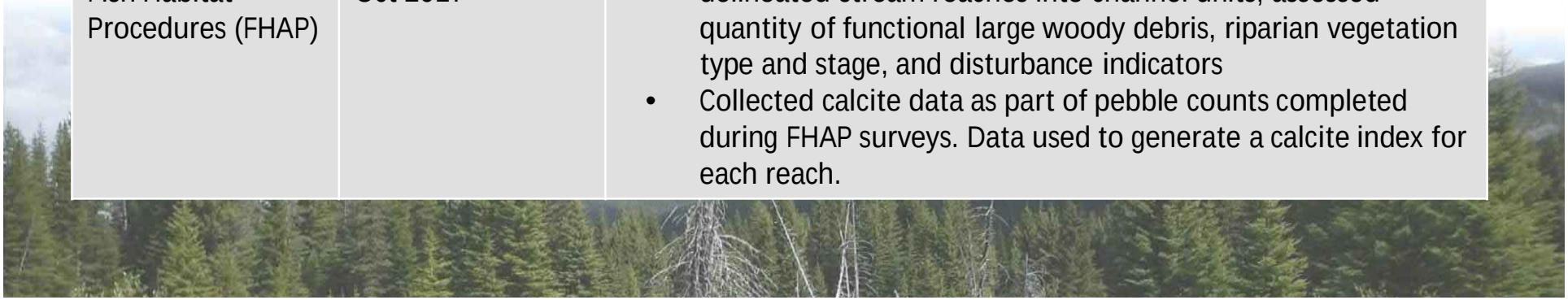
Aquatic Valued Components

- Receptor Valued Components
  - Fish and Fish Habitat
    - Westslope cutthroat trout, bull trout, kokanee, burbot, longnose sucker, mountain whitefish
  - Aquatic Health
    - Benthic invertebrates, fish tissues, sediment
- Intermediate Valued Components
  - Surface Water Quality
  - Surface Water Quantity (Hydrology)
  - Groundwater Quality/Quantity



Fish and Fish Habitat

Survey Type	Dates	Survey Details
Fish inventory sampling	July 2014 Aug 2017	• Determined upstream limit of fish distribution • Electrofishing and minnow traps • Habitat data collected
Fish community sampling	Aug/Sept 2017 Sept 2019 (Lower Alexander)	• Assessed fish density within fish-bearing sections • Collected habitat type: length, gradient, water depth, cover type, off-channel habitat, and barriers
Fish spawning surveys	July 2014 June 2017 Oct 2014/2017 Sept 2019	• Assessed spawning activity and spawning habitat • Described redds, spawning fish, and spawning habitat (cover, proximity to holding water, adequate flows, suitable grave size)
Overwintering surveys	March 2014	• Assessed suitable overwintering habitat potential • Collected water temperature, dissolved oxygen, water depth, ice cover, and flow rates
Level 1 Fish and Fish Habitat Procedures (FHAP)	Aug – Sept 2014 Oct 2017	• Described habitat quality within fish bearing reaches and delineated stream reaches into channel units, assessed quantity of functional large woody debris, riparian vegetation type and stage, and disturbance indicators • Collected calcite data as part of pebble counts completed during FHAP surveys. Data used to generate a calcite index for each reach.



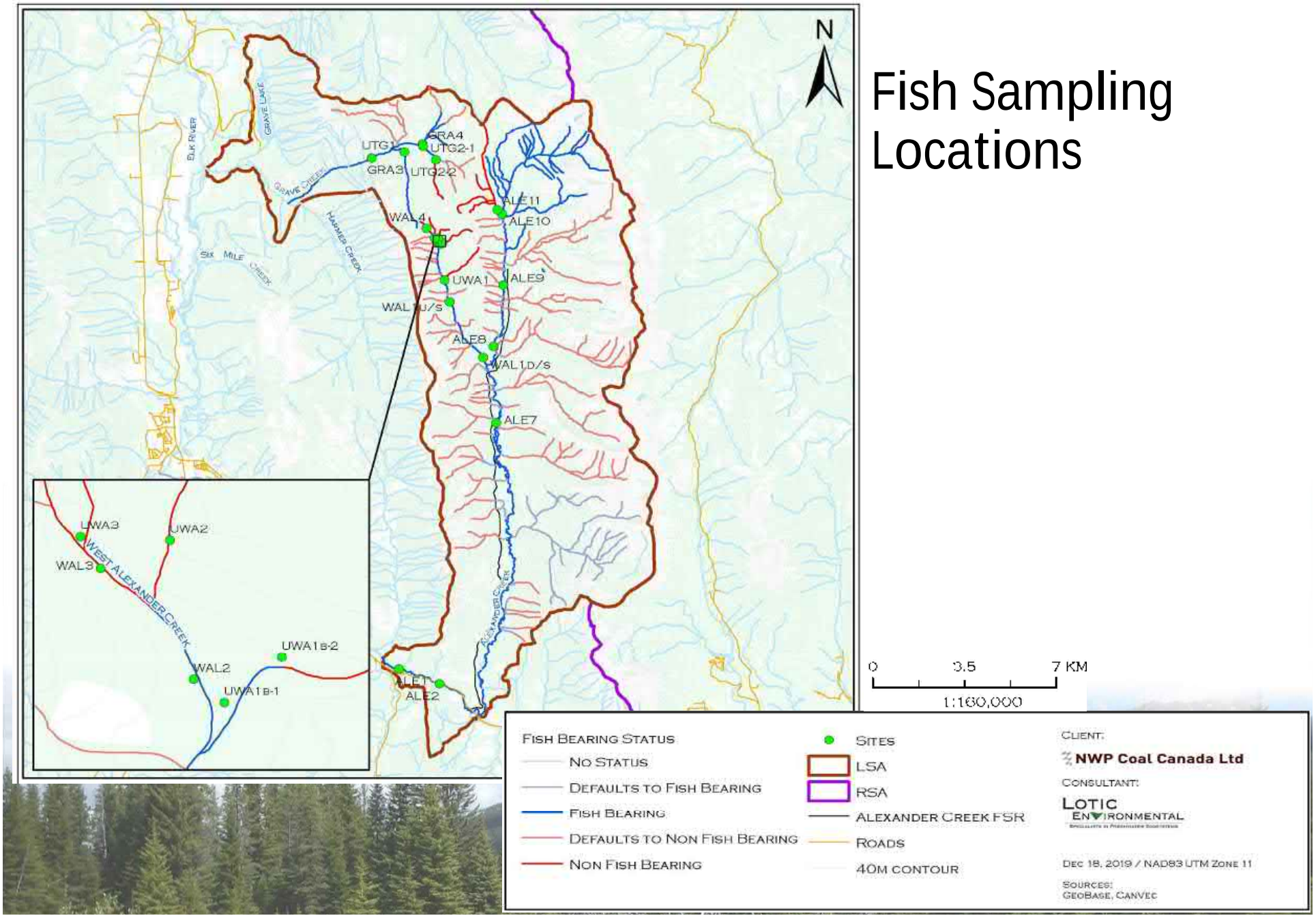
Fish and Fish Habitat

Survey Type	Dates	Survey Details
Aquatic health (fish tissues, benthics, sediments)	July – Aug 2017	• Determined baseline contaminant levels for the Aquatic Health discipline • Captured 8 fish per reach by electrofishing and collected 4 mm muscle plugs using a biopsy punch
Fish migration assessment (Grave Creek)	Aug 2018 – June 2019	• Assessed fish habitat changes that may result from reductions in the quantity of stream flow from the proposed point of diversion on Grave Creek, downstream to the confluence with Harmer Creek • Assessment of riffle passage
Lentic ecosystem surveys	September 2019	• Surveyed 6 wetlands for fish absence/presence using electrofishing and minnow traps, general observations (substrate, depth, length/width, side channels, inflow/outflow channels), and in-situ water quality

Photo: Adult Westslope Cutthroat Trout (fork length of 202 mm) salvaged from West Alexander Creek Reach 2

Photo: Redd of unknown spawning species at Alexander Creek Reach 7

Fish Sampling Locations



Fish and Fish Habitat

- Fish-bearing watercourses:
  - Alexander Creek
  - West Alexander Creek
  - Grave Creek
  - Unnamed Tributaries of Grave Creek #1 and #2
- Low fish densities in the LSA
- Westslope cutthroat trout most abundant species
  - Found in Alexander, West Alexander, and Grave Creeks
  - Bull trout and eastern brook trout also detected in Alexander Creek

Fish and Fish Habitat

- Varied habitat quality in Alexander and West Alexander Creek
  - Highly suitable fish habitat in lower reaches
  - Good overwintering potential in Alexander Creek (Reach 7) due to warm water temperatures and suitable pools
  - Decreased quality in the upper reaches due to increased gradient and reduced stream size

Westslope Cutthroat Trout

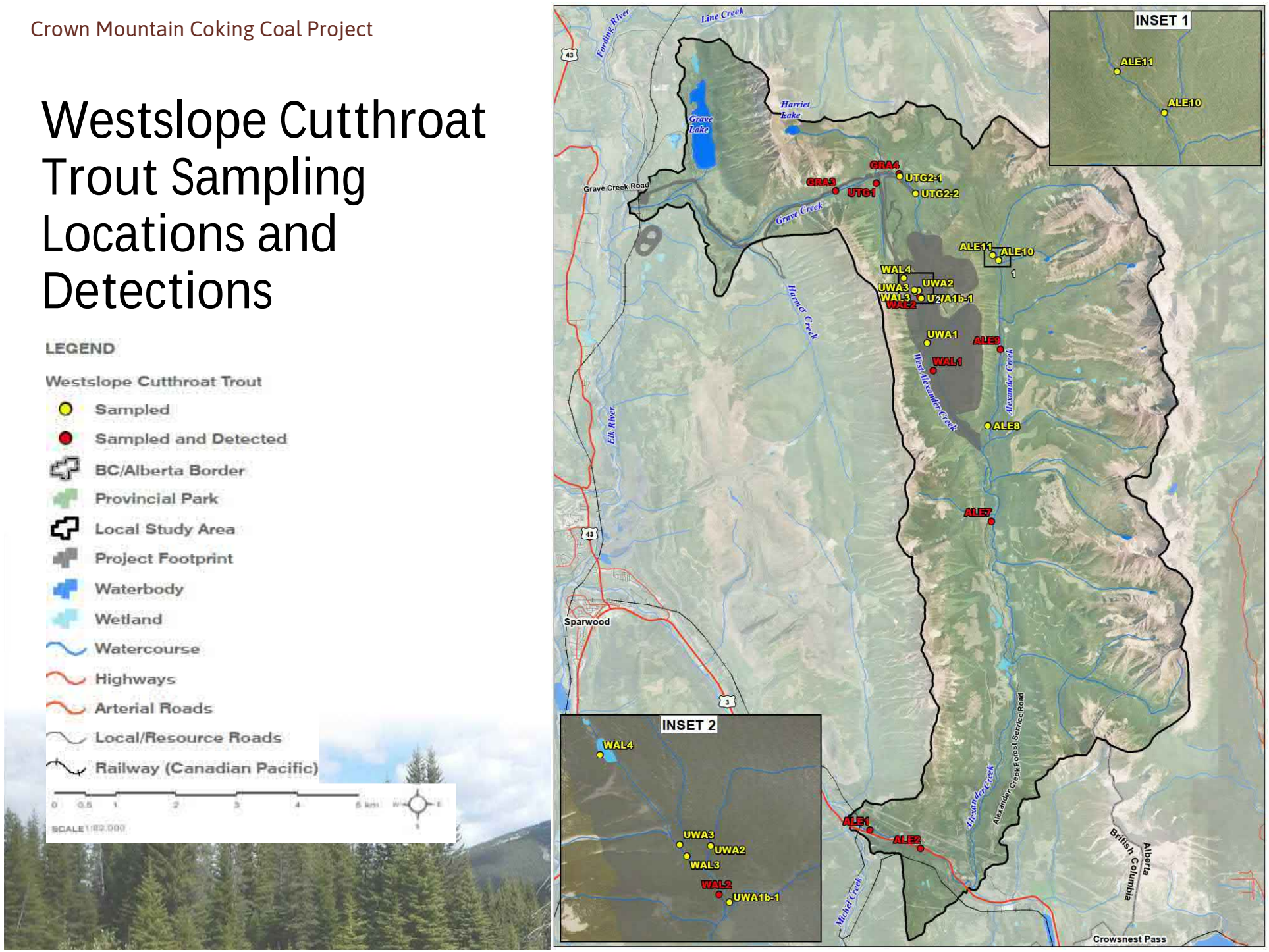
- Species listed as Schedule 1 – Special Concern under SARA
- Provincially Blue-listed in BC
- Important recreational, commercial, and/or Indigenous values
- Largest range within LSA
- The only fish species found in the upper reaches of the Grave Creek watershed and tributaries

Photo: Westslope Cutthroat Trout (fork length of 146 mm) from Alexander Creek Reach 9

Survey Dates	Survey Details	Results

2014, 2017, and 2019	• Spring spawning
	• Fish inventory sampling
	• Fish community sampling
		• Ubiquitous in LSA
		• WCT was only species found in upper Grave Creek at time of surveys; assumed isolated population
		• Suitable spawning habitat:
		  ○ Alexander Creek Reaches 1, 2, 7-9
		  ○ West Alexander Creek Reach 1
		  ○ Grave Creek Reaches 3-4
		  ○ Unnamed Tributaries of Grave Creek #1 and #2
		• Adult WCT observed pairing during surveys, suggesting spawning is occurring in LSA
		• Highest WCT densities at Grave Creek and West Alexander Creek

Westslope Cutthroat Trout Sampling Locations and Detections



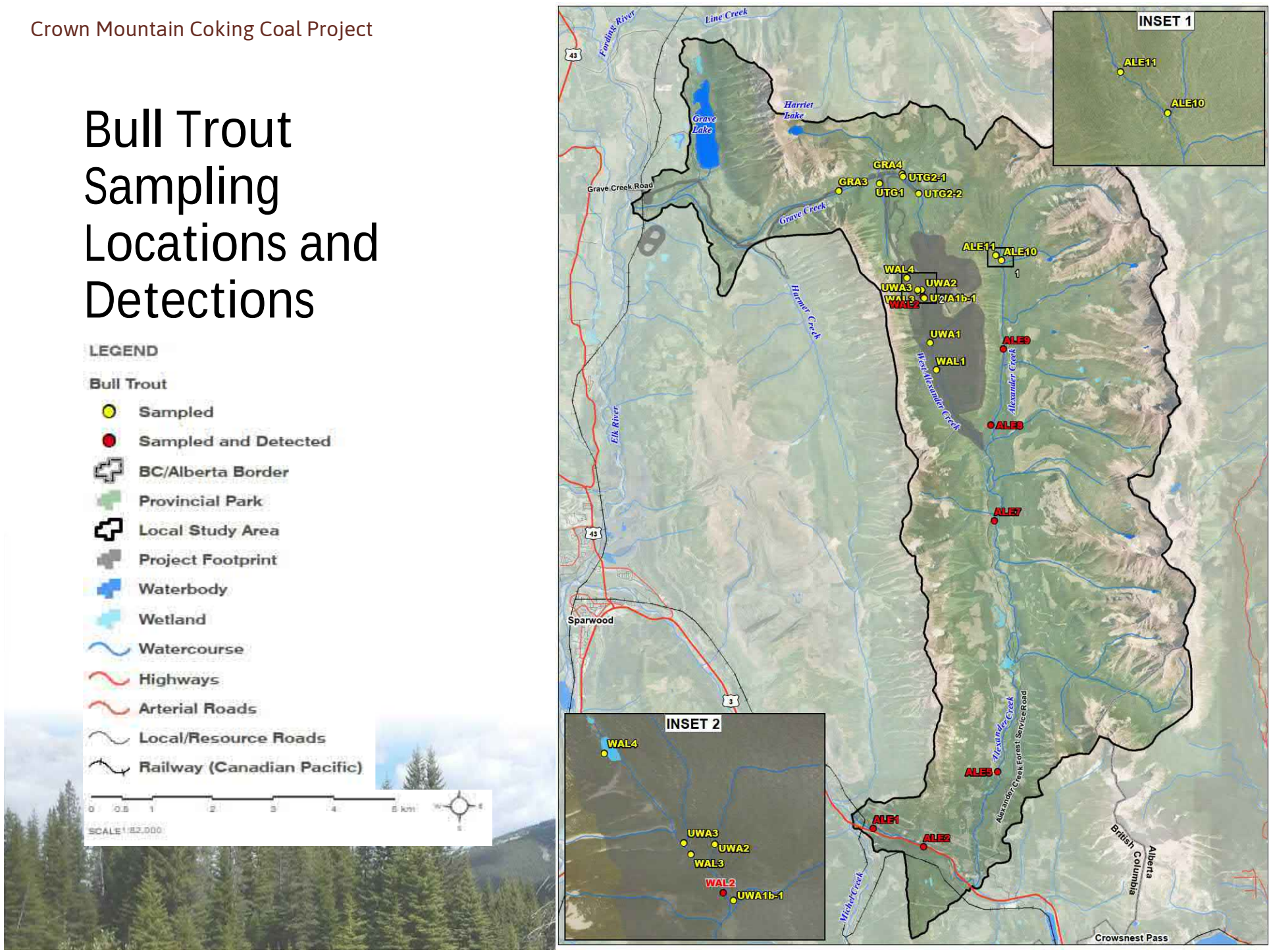
Bull Trout

- Listed as Special Concern by COSEWIC (Not at Risk – SARA Schedule 1)
- Provincially Blue-listed
- Important recreational, commercial, and/or Indigenous values
- Primarily in the Michel Creek and Elk River mainstem, but also have moderate juvenile distribution in Alexander Creek

Photos: Juvenile Bull Trout salvaged from Alexander Creek Reach 8 and West Alexander Creek Reach 1, respectively

Survey Dates	Survey Details	Results
2014, 2017, and 2019	• Fall spawning • Fish inventory sampling • Fish community sampling	• BT captured/observed in Alexander Creek Reaches 7-9 • BT spawning suspected to occur in Alexander Creek (presence of potential redds and BT)

Bull Trout Sampling Locations and Detections



Kokanee & Burbot

- Kokanee:
  - Provincially Yellow-listed
  - Important for fishing and consumption
  - Grave Lake population stocked
  - Key representative planktivore species - important to assess impacts to aquatic resources
- Burbot:
  - Lower Kootenay population is provincially Red-listed
  - Important recreational, commercial, and/or Indigenous values
  - Found within the RSA

Photo: Wetland at West Alexander Creek Reach 4, not suitable fish habitat due to steep slope gradient and frequent dewatering

Survey Dates	Survey Details	Results
2014, 2017, and 2019	Fish inventory and community sampling	Kokanee and burbot not detected in the LSA during baseline surveys

Longnose Sucker

- Provincially Yellow-listed
- Important recreational, commercial, and/or Indigenous values
- Primarily in lentic/wetland habitats and in lower gradient reaches of the Elk River watershed
- Useful wildlife prey species

Photo: Cascade habitat at Alexander Creek Reach 7. Longnose Sucker not detected within this reach.

Survey Dates	Survey Details	Results
2014, 2017, and 2019	Fish inventory and community sampling	• No detection in LSA during baseline surveys • Previously documented in nearby wetlands

Mountain Whitefish

- Provincially Yellow-listed
- Important recreational, commercial, and/or Indigenous values
- Primarily mainstream species, not frequently observed in reaches lower than 4th order
- Known spawning in mainstream Michel Creek and Elk and Fording Rivers

Photo: Typical stream habitat at Alexander Creek Reach 11. Mountain Whitefish not detected within this reach.

Survey Dates	Survey Details	Results
2014, 2017, and 2019	Fish inventory and community sampling	• No detection in LSA during baseline surveys • Species known to occur in lower Alexander Creek near Michel Creek

Benthic Communities

- Sampling conducted in Alexander Creek, West Alexander Creek, Grave Creek, and unnamed tributaries of West Alexander and Grave Creeks
- Both benthic invertebrates and periphyton sampled

Survey Dates	Survey Details	Results
Oct 2014, 2017, and 2019	• 25 benthic samples at 9, 10, and 2 sites (2014, 2017, and 2019 respectively) at riffle/glide habitats • Periphyton not a VC but sampled to better understand baseline	• Sites generally good condition • Benthics mostly Ephemeroptera and Plecoptera orders (sensitive species) • EPT proportions between 65% and 99% • Periphyton communities mainly cyanobacteria and diatoms

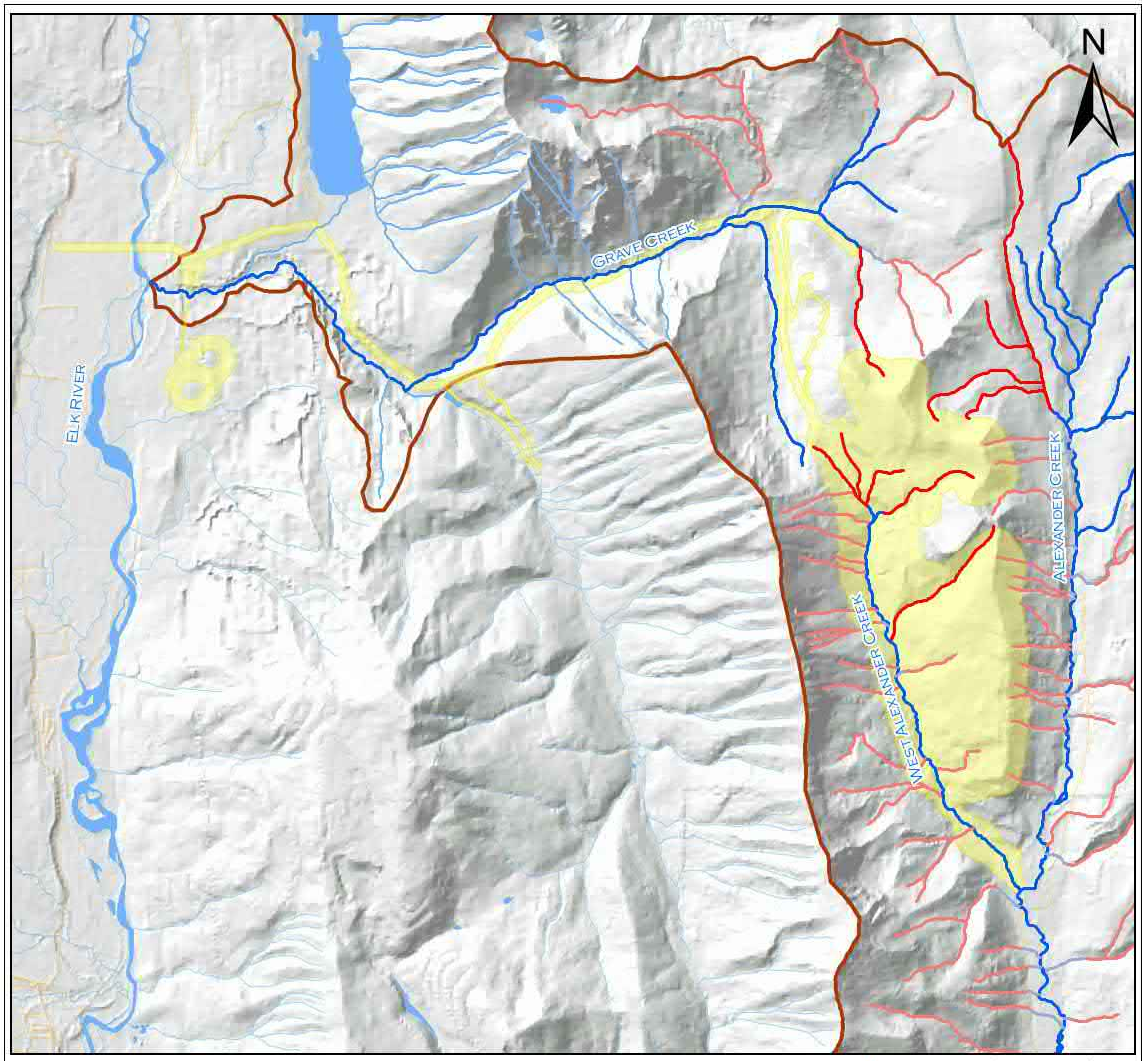
Key Findings

- Two Species of Special Concern – Westslope cutthroat trout and bull trout
- Isolated, genetically pure WCT population in Grave Creek; life stages distributed throughout
- Both species in Alexander Creek/West Alexander Creek
- Expanded understanding of BT distribution
- West Alexander Creek suspected as high use WCT spawning habitat
- Alexander Creek reaches 5-7 documented BT spawning
- Overwintering suspected in Alexander Creek Reach 7
- Overall densities follow typical elevational pattern

Key Findings

- West Alexander Creek Reach 1 suspected as high use WCT spawning habitat
- Higher use juvenile rearing
- Poor overwintering potential
- Reach 1 – 6,750 m long, 5.89 m wbf
- Reach 2 – 260 m long, 3.82 m wbf
- Total fish bearing habitat ~40, 750 m2
- Residual loss projected

Project Footprint and Fish Bearing Reaches



CROWN MOUNTAIN PROJECT FOOTPRINT AND FISH BEARING STATUS OF CREEKS

0 1.25 2.5 KM

1:70,000

FISH BEARING STATUS
- WATER NETWORK - NO STATUS
- DEFAULTS TO FISH BEARING
- FISH BEARING
- DEFAULTS TO NON FISH BEARING
- NON FISH BEARING

- PROJECT FOOTPRINT
- LSA
- ROADS

CLIENT:
NWP Coal Canada Ltd

CONSULTANT:
LOTIC ENVIRONMENTAL
SPECIALISTS IN FRESHWATER ECOSYSTEMS

APRIL 16, 2020 / NAD83 UTM ZONE 11

SOURCES:
GEOBASE, CANVEC

Effects Assessment

- Direct/Physical Impacts
  - Mine infrastructure: pit development, waste rock storage, water management, and development of other associated infrastructure (e.g., roads, rail, gas lines, power lines)
  - Geomorphological changes to fish habitats (e.g., modification of substrates, dynamic imbalance, silling of spawning beds)
  - Hydrological and hydrometric changes to fish habitat (e.g., instream flows)
  - Riparian losses
  - Modifications in fish migration or local movements (i.e., creation of barriers)
- Residual Effects Assessment

Effects Assessment

- Indirect impacts anticipated to be related to:
  - Changes in water (e.g., calcite, stream temperature)
  - Changes in watershed condition (roads, riparian state, and land-use)
  - Increased angling pressure

- Cumulative Effects Assessment
  - Six scenarios to be evaluated:
    1) Base Case
    2) Application Case
    3) Reasonable Foreseeable Development (RFD) Case
    4) Base Case with Climate Change
    5) Application Case with Climate Change
    6) RFD with Climate Change

Offsetting Strategy

- Developed through Working Group collaboration
- Local opportunity – Roads, crossings, cattle management, large woody debris (LWD) enrichment
- RSA – Fish habitat connectivity, riparian planting, Michel Creek enhancement (instream LWD, riparian)

Questions and Discussion