Inuvik – Tuktoyaktuk Highway Baseline Data Acquisition Program: Wildlife Habitat Potential Mapping

Preliminary Draft Report

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Prepared for:
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Yellowknife, NT

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Abbreviations

DOT.....Department of Transportation
EIRB .....Environmental Impact Review Board
EIS.....Environmental Impact Statement
ENR……Environment and Natural Resources GNWT
EOSD ..... Earth Observation for Sustainable Development of Forests
IOL…….Imperial Oil Limited
GIS ..... Geographic Information System
GNWT .....Government of the Northwest Territories
MGP .....Mackenzie Gas Project

1 INTRODUCTION

1.1 PROJECT BACKGROUND

The Government of the Northwest Territories (GNWT), Department of Transportation (DOT), the Town of Inuvik and the Hamlet of Tuktoyaktuk are proposing to construct a 140 km all-season highway to connect the Town of Inuvik with the Hamlet of Tuktoyaktuk (the project). The project is wholly within the Inuvialuit Settlement Region, with portions of the highway crossing Inuvialuit 7(1)(a), 7(1)(b) and Crown lands. The project is currently undergoing a substituted Panel review by the Environmental Impact Review Board. An Environmental Impact Statement (EIS) was submitted in May 2011. The EIS has undergone a conformity review by the EIRB and reviewers, where a number of deficiencies have been identified. The goal of the present report is to present additional information related to the identification of habitat suitability for four birds listed under Schedule 1 of the *Species at Risk Act,* as well as concentrations of breeding waterbirds, within a 1 km corridor centered on the project's proposed Alignments #1 and #3 (Alternate and Preferred) as filed in the EIS and supplementary documents.

1.2 STUDY OBJECTIVES

The scope of the wildlife habitat suitability study includes the following tasks:

- Summarize habitat associations of bird species at risk occurring in the project study area (Horned Grebe, Peregrine Falcon, Short-eared Owl, Rusty Blackbird)
- Categorize suitability of habitat types within the project study area for bird species at risk and waterbirds
- Map habitat suitability in the project study area for each bird species at risk, as well as waterbirds
- Identify any locations within the project study area where species at risk or waterbirds are likely to be concentrated, and suggest mitigation measures to limit effects of the project

The study will be completed in two parts:

(1) Preliminary wildlife habitat classification and habitat potential mapping based on desktop review

(2) Final wildlife habitat classification and mapping based on desktop review and field verification

The present report summarizes the results of (1) – preliminary wildlife habitat classification and habitat potential mapping, based on desktop review only. This preliminary mapping has not been field verified. Field studies are planned to be undertaken July 2 – 6, 2012.

2 METHODOLOGY

The following section describes the methodology used to complete wildlife habitat suitability classification and habitat potential mapping.

2.1 REVIEW OF EXISTING INFORMATION

KAVIK-STANTEC's Preliminary Draft Vegetation Mapping Report (KAVIK-STANTEC, 2012) describes vegetation classes in the Inuvik to Tuktoyaktuk Highway study area, based on literature review and image interpretation. The vegetation classes presented in the Vegetation Mapping Report are supplemented by water and terrain classes, also defined using desktop methods. These vegetation, water and terrain classes have been used in conjunction with knowledge about habitat preferences, to define wildlife habitat suitability across the project study area. Background information regarding status, distribution, and habitat associations of waterbirds and species at risk was compiled from key species-specific references, including Birds of North America accounts, COSEWIC status reports, and wildlife reports from the region of the project or elsewhere in the western Canadian arctic (e.g. IOL et al., 2004; Hines et al. 2004; Hines and Fournier 2005; Hines and Robertson 2006).

2.2 MAPPING METHODOLOGY

2.2.1 Vegetation, Water and Terrain Classes

Nine unique vegetation types in the project study area have been identified in the Preliminary Vegetation Report (KAVIK-STANTEC 2012):

- Dry Saxifrage Tundra
- Dwarf Shrub Heath
- Dwarf Shrub Heath/Upland Shrub
- Cotton-Grass Tussock
- High-Centred Polygons
- Low-Centred Polygons
- Riparian Shrub
- Riparian Sedge - Cotton-Grass
- Riparian Black Spruce/Shrub

In addition to these nine vegetation type classes, two water classes and four terrain (slope) classes have been added to define wildife habitat potential:

- Ponds (less than 2 ha)
- Lakes (2 ha or greater)
- Flat to gentle slope (0-15%)
- Moderate to strong slope (15-45%)
- Very strong to extreme slope (45-85%)
- Steep slope (above 85%)

2.2.2 Wildlife Habitat Suitability Mapping

The distribution of wildlife is generally closely linked to the availability of habitat, and the preferences of each species. Habitat associations for most birds are quite well described, although they can vary considerably across the range of a species, and as much as possible, local data should be given priority. For each of the four species at risk, as well as for waterbirds in general, habitat suitability was assessed for each of the vegetation types, water and terrain classes, with reference to habitat preferences reported in literature, emphasizing sources from the Northwest Territories or elsewhere in the arctic where available.

2.2.3 Field Verification

A field verification program will be completed July 2012. The program will be designed to collect observations of bird species at risk and waterbirds to validate and update the habitat suitability modeling, as well as to identify concentrations of these species or other wildlife that may be important to consider with respect to project design and mitigation.

2.2.4 Final Wildlife Habitat Suitability Mapping

A final wildlife habitat suitability map atlas will be produced at a scale of 1:10,000 for each of the four bird species at risk, depicting probability of occurrence across the project area as predicted by habitat type and field observations.

3 RESULTS

3.1 Wildlife Habitat Suitability

3.1.1 Horned Grebe

Horned Grebe (*Podiceps auritus*) is a small waterbird classified as Special Concern by COSEWIC and pending status assignment under SARA (GC 2011); it is also considered Sensitive in the Northwest Territories (WGNWTS 2012). The project area is just within the northern limits of the breeding range of Horned Grebe (Stedman 2000, GNWT 2012).

Aside from nesting, Horned Grebes are primarily aquatic, and their distribution is largely dependent on availability of suitable wetlands. Breeding sites are most commonly small wetlands with emergent vegetation (particularly cattails and sedges) along the margins and enough open water and depth to allow for diving (Stedman 2000). In a ten-year study around Yellowknife, Fournier and Hines (1999) found that ponds smaller than 0.1 ha were almost never occupied, whereas those between 0.3 ha and 2 ha were most frequently used, and occupancy dropped off noticeably again at ponds larger than 4 ha. Faaborg (1976) also noted a strong preference for ponds smaller than 1 ha in a broader review. Availability of residual emergent growth from the previous year, especially cattail and willow, appears to be preferred (Fournier and Hines 1999).

Land cover data available for the project data allows for identification of ponds as small as approximately 0.1 ha, but smaller waterbodies are not mapped. Given the preferences for small ponds as described in the literature for Northwest Territories and elsewhere, habitat suitability for Horned Grebe is therefore assessed as high for ponds (waterbodies up to 2 ha), moderate for lakes (waterbodies >2 ha), and nil for all terrestrial habitat classes.

3.1.2 Waterbirds

A wide variety of waterbirds breed in the project area, including various waterfowl (ducks, geese, swans), loons, grebes, shorebirds, gulls, terns, and jaegers). Of particular interest are species important for subsistence as identified in Kiggiak-EBA (2011) (Tundra Swan, Greater White-fronted Goose, Snow Goose, Canada Goose, Mallard, and Northern Pintail) and shorebirds as a group, given that many species have been in decline. Other waterbirds that have been assessed for nearby projects include Greater and Lesser Scaup, Whimbrel, and Arctic Tern (IOL et al., 2004). The evaluation of habitat suitability for waterbirds therefore focuses principally on waterfowl and shorebirds, although the habitat requirements of most other waterbirds in the area are similar.

While waterbirds are generally dependent on proximity to waterbodies, waterfowl and shorebirds nest on adjacent upland habitat. Considering in particular the large number of waterbird species present in the project area, all upland habitat types provide some degree of nesting potential. However, overall waterbird density is likely to be highest in vegetation types dominated by low ground cover, and lowest

where trees and large shrubs dominate. Bare areas may also be somewhat less attractive for many species due to lack of cover.

Habitat suitability for waterbirds is therefore expected to be high for cottongrass tussock, high-centred and low-centred polygons, and riparian sedge-cottongrass; moderate for dry saxifrage tundra, dwarf shrub heath, riparian shrub; and low for upland shrub and riparian black spruce/shrub. Although waterbodies are not used for nesting, they are important for feeding, and all are ranked as high. Slope classes are not used to rank habitat for waterbirds.

3.1.3 Peregrine Falcon

Peregrine Falcon (*Falco peregrinus*) is a raptor classified as Special Concern by COSEWIC and as Threatened (*anatum* subspecies) or Special Concern (*tundrius* subspecies) under Schedule 1 of SARA (GC 2011); it is also considered Sensitive in the Northwest Territories (WGNWTS 2012). The entire project area is well within the breeding range of Peregrine Falcon, and the *anatum* subspecies is considered dominant in this area (White et al. 2002, GNWT 2012).

Among the most widely distributed birds in the world, Peregrine Falcons are associated with a wide variety of habitats, but nest sites are consistently on cliffs or other elevated ledges, and often near water (White et al. 2002). In the arctic, Peregrine Falcons often nest on cliffs much lower than they would use elsewhere, sometimes 10 m or less (Jenkins and Hockey 2001). Northern nest sites often include river banks and other steep slopes, as well as rock outcrops. In a five-year study around Rankin Inlet, 29 cliff nests ranged from 4 to 26 m above ground, all were within 300 m of significant water bodies, and the majority had a southerly exposure (Court et al. 1988). Peregrine Falcons in the Northwest Territories often occupy stick nests previously built by Common Ravens (*Corvus corax*) or Rough-legged Hawks (*Buteo lagopus*), as these may offer flat surfaces otherwise scarce on some slopes (Calef and Heard 1979; Court et al. 1988). Notwithstanding these requirements for nesting, Peregrine Falcon often hunt over large territories and can therefore be seen far from breeding habitat (White et al. 2002).

The abundance of water bodies within the project area is attractive to Peregrine Falcons and provides an abundance of potential prey, but distribution is limited by availability of potential nesting sites, namely steep river and lake banks. Therefore no ranking is assigned to the terrestrial and aquatic habitat classes, but is instead estimated by slope class as discerned from terrain mapping and LiDAR imagery. Steep slopes (above 85%) are considered to provide high suitability habitat; very strong to extreme slopes (45-85%) are moderate; moderate to strong slopes (15-45%) are low, and flat to gentle slopes (0-15%) are not considered to provide any nesting habitat for Peregrine Falcons.

3.1.4 Short-Eared Owl

Short-eared Owl (*Asio flammeus*) is a medium-sized owl classified as Special Concern by COSEWIC and pending status assignment under SARA (GC 2011); it is also considered Sensitive in the Northwest Territories (WGNWTS 2012). The project area is entirely within the breeding range of Short-eared Owl (Wiggins et al. 2006, GNWT 2012), and aerial waterfowl surveys between 1989 and 2008 detected

several incidental sightings of Short-eared Owls in the region south and west of Tuktoyaktuk (CWS, unpub. data).

Short-eared Owls occupy a wide variety of open habitats, ranging from grassland to tundra and also including a variety of wetlands such as bogs and marshes (Wiggins et al. 2006). They nest on the ground, often favouring locations that are somewhat concealed by taller grasses and slightly higher than surrounding areas (e.g. hummocks), and may feature dead and matted-down vegetation from the previous year (Holt 1992, Wiggins et al. 2006, Keyes 2011). In parts of its range, Short-eared Owl is quite nomadic in response to variability in prey populations, especially voles or lemmings, posing challenges for estimation of local and regional populations (Wiggins et al. 2006, COSEWIC 2008). There is some evidence that Short-eared Owls may desert their nests if disturbed during laying and incubation (Leasure and Holt 1991, GNWT 2012).

Most terrestrial habitat within the project area is open and therefore has some potential as breeding habitat for Short-eared Owl; the least suitable habitat type in the project area is riparian black spruce-shrub, but even within patches of that habitat there may be open areas with some potential for nesting. Habitat suitability takes into consideration the preference for open grassy habitat and slightly elevated patches. Therefore cottongrass-tussock and low-centred polygons are considered to have high potential for Short-eared Owl; dwarf shrub heath, high-centred polygons and riparian sedge-cottongrass to have moderate potential; and dry saxifrage tundra, upland shrub, riparian shrub, and riparian black spruce-shrub to have low potential. Aquatic habitat and slopes are are not applicable for assessing habitat suitability.

3.1.5 Rusty Blackbird

Rusty Blackbird (*Euphagus carolinus*) is a medium-sized songbird classified as Special Concern by COSEWIC and listed as Special Concern under Schedule 1 of SARA (GC 2011); it is also considered Sensitive in the Northwest Territories (WGNWTS 2012). The project area is just within the northern limits of the breeding range of Rusty Blackbird (Avery 1995, GNWT 2012), with previous monitoring along the Mackenzie Valley (Machtans et al. 2007) and one incidental record of Rusty Blackbird from aerial waterfowl surveys in the region, approximately 45 km southwest of Tuktoyaktuk (CWS, unpub. data).

Rusty Blackbird is largely a bird of boreal forest wetlands; while its breeding range extends a bit to both the north and south, it is rare beyond the tree line (Avery 1995, COSEWIC 2006). Bogs, fens, swamps, riparian corridors, and shrubby meadows all provide suitable habitat, as the key requirements are easy access to aquatic invertebrates as prey, and dense shrubs or small trees for nesting and shelter (Avery 1995, COSEWIC 2006). Upland habitat may be used during migration, but does not offer breeding potential (COSEWIC 2006).

Given the abundance of water bodies in the project area, proximity of water is assumed to not be a limiting factor for Rusty Blackbirds. Habitat suitability is instead determined by availability of shrubs for nesting. Therefore riparian shrub and riparian black spruce-shrub are considered high potential habitat for Rusty Blackbird because they combine nesting habitat with proximity to water, while dwarf shrub heath/upland shrub, low-centred polygons, and riparian sedge-cottongrass have low potential because

nesting options are likely to be present, but limited. Other terrestrial habitats that lack shrubs are rated nil for habitat suitability. Slopes are not used to assess habitat suitability.

3.2 Wildlife Habitat Suitability Mapping

Based on habitat preferences as summarized in section 3.1, habitat suitability ratings are compiled in Table 3-1 for the four bird species at risk, in each of the terrestrial and aquatic habitat classes and slope categories.

Table 3-1 Habitat suitability ratings for Horned Grebe, Peregrine Falcon, Short-eared Owl, and Rusty Blackbird

Vegetation, Water or Terrain Class	Habitat Rating				
	Horned Grebe	Waterbirds	Peregrine Falcon	Short-eared Owl	Rusty Blackbird
01 Dry Saxifrage Tundra	4	2	n/a	3	4
02 Dwarf Shrub Heath	4	2	n/a	2	4
03 Dwarf Shrub Heath/Upland Shrub	4	3	n/a	3	3
04 Cotton-Grass Tussock	4	1	n/a	1	4
05 High-Centred Polygons	4	1	n/a	2	4
06 Low-Centred Polygons	4	1	n/a	1	3
07 Riparian Shrub	4	2	n/a	3	1
08 Riparian Sedge - Cotton-Grass	4	1	n/a	2	3
13 Riparian Black Spruce/Shrub	4	3	n/a	3	1
Pond (<2 ha)	1	1	n/a	n/a	4
Lake (2+ ha)	2	1	n/a	n/a	4
Flat to gentle slope (0-15%)	n/a	n/a	4	n/a	n/a
Moderate to strong slope (15-45%)	n/a	n/a	3	n/a	n/a
Very strong to extreme slope (45-85%)	n/a	n/a	2	n/a	n/a
Steep slope (>85%)	n/a	n/a	1	n/a	n/a
	NOTES: Habitat suitability is rated as follows: 1 = high, 2 = moderate, 3 = low and 4 = very low to nil. n/a = not applicable as a rating criteria for this species.				

The resulting habitat suitability distribution, based on the above ratings, has been displayed on separate potential habitat suitability maps for each of the species at risk and waterbirds, within the project study area.

4 LIMITATIONS AND NEXT STEPS

This wildlife habitat suitability mapping product is a preliminary draft depicting the potential for waterbirds and four avian species at risk to occur within the 1 km wide project corridor as determined by vegetation polygon mapping and habitat preferences of these species. Precision of mapping is limited by the level of detail applied to delineation of the vegetation polygons. The classifications and mapped distribution have not been field verified.

A field program to survey these four species at risk is planned for July 2012. A sample of the polygons of each type will be visited to record species present and their abundance. Data collected will include:

- GPS coordinates
- Site photos (minimum of 2 at each site)
- Slope position and aspect
- List of all bird species observed, including abundance, as well as age and sex where possible

Results of the field survey will be used to adjust and edit the preliminary mapping to further refine the wildlife habitat suitability mapping, which may also be improved by subdivision of original terrain polygons as a result of vegetation field work, and further cross-referencing with previous observations from local databases, and key areas for migratory birds as defined by Latour et al (2006).

A final wildlife habitat suitability map and report will be available August 31, 2012.

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