



SUMMARY RESULTS

Investigating Potential Impacts of Wind Power Development in the M-KMA – Composite Maps for Wind Speed

MICHELINE SNIVELY¹

MARCH 24, 2011

¹Wildlife Infometrics Inc., PO Box 308, Mackenzie, BC, V0J 2C0, wild_info@wildlifeinfometrics.com

Prepared for Ministry of Agriculture and Lands under contract #CFSAL1102

CITATION: Snively, M. 2011. Investigating Impacts of Wind Power Development in the M-KMA – Composite Maps for Wind Speed. Wildlife Infometrics Inc. Report No. 370. Wildlife Infometrics Inc., Mackenzie, British Columbia, Canada.

TABLE OF CONTENTS

LIST OF TABLES.....	i
LIST OF FIGURES	i
INTRODUCTION	1
Composite Maps	2
METHODS.....	5
Viewshed Analysis	5
SPATIAL DATA SUMMARY	6
LITERATURE CITED	7

LIST OF TABLES

Table 1. Composite Maps Listing.....	2
Table 2. Spatial Data Listing.....	6

LIST OF FIGURES

Figure 1. Key Map for the existing IUP composite maps	3
Figure 2. Key Map for the PWPDA composite maps	4

INTRODUCTION

The purpose of this document is to acknowledge the delivery of a series of composite maps identifying portions of the Muskwa-Kechika Management Area (M-KMA) where wind speeds equal and exceed 6.0m/s, where wind power development is or is not constrained by physical terrain elements, and what portions of the M-KMA are visible to wind tower locations as per the viewshed analysis conducted.

The maps were delivered in fulfillment of deliverable 4¹ of the contract CFSAL1102 (*Investigating Impacts of Wind Power Development in the M-KMA*) undertaken by Wildlifeinfometrics Inc. for the Muskwa-Kechika Advisory Board.

The Composite Maps section lists all maps submitted for both the existing Investigative Use Permits (IUPs) and the potential wind power development areas (PWPDA). Two key maps are provided to assist in locating each of the composite maps.

¹ Excerpt from contract: "4. Create composite map(s) showing the physical feasibility and the existing wind power tenures to determine their physical compatibility with M-KMA values."

Composite Maps

Please see Table 1 below for a listing of the composite maps associated with this report. Please see Figure 1 and Figure 2 for the key maps identifying the location of each composite map.

Table 1. Composite Maps Listing

Filename	Source
MKMA_Deliverable_4_Existing_IUP_1	
MKMA_Deliverable_4_Existing_IUP_2	
MKMA_Deliverable_4_Existing_IUP_3	
MKMA_Deliverable_4_Existing_IUP_4	
MKMA_Deliverable_4_Existing_IUP_5	
MKMA_Deliverable_4_Potential_IUP_1	
MKMA_Deliverable_4_Potential_IUP_2	
MKMA_Deliverable_4_Potential_IUP_3	
MKMA_Deliverable_4_Potential_IUP_4	
MKMA_Deliverable_4_Potential_IUP_5	
MKMA_Deliverable_4_Potential_IUP_6	
MKMA_Deliverable_4_Potential_IUP_7	
MKMA_Deliverable_4_Potential_IUP_8	
MKMA_Deliverable_4_Potential_IUP_9	
MKMA_Deliverable_4_Potential_IUP_10	
MKMA_Deliverable_4_Potential_IUP_11	WII
MKMA_Deliverable_4_Potential_IUP_12	
MKMA_Deliverable_4_Potential_IUP_13	
MKMA_Deliverable_4_Potential_IUP_14	
MKMA_Deliverable_4_Potential_IUP_15	
MKMA_Deliverable_4_Potential_IUP_16	
MKMA_Deliverable_4_Potential_IUP_17	
MKMA_Deliverable_4_Potential_IUP_18	
MKMA_Deliverable_4_Potential_IUP_19	
MKMA_Deliverable_4_Potential_IUP_20	
MKMA_Deliverable_4_Potential_IUP_21	
MKMA_Deliverable_4_Potential_IUP_22	
MKMA_Deliverable_4_Potential_IUP_23	
MKMA_Deliverable_4_Potential_IUP_24	
MKMA_Deliverable_4_Potential_IUP_25	
MKMA_Deliverable_4_Potential_IUP_26	

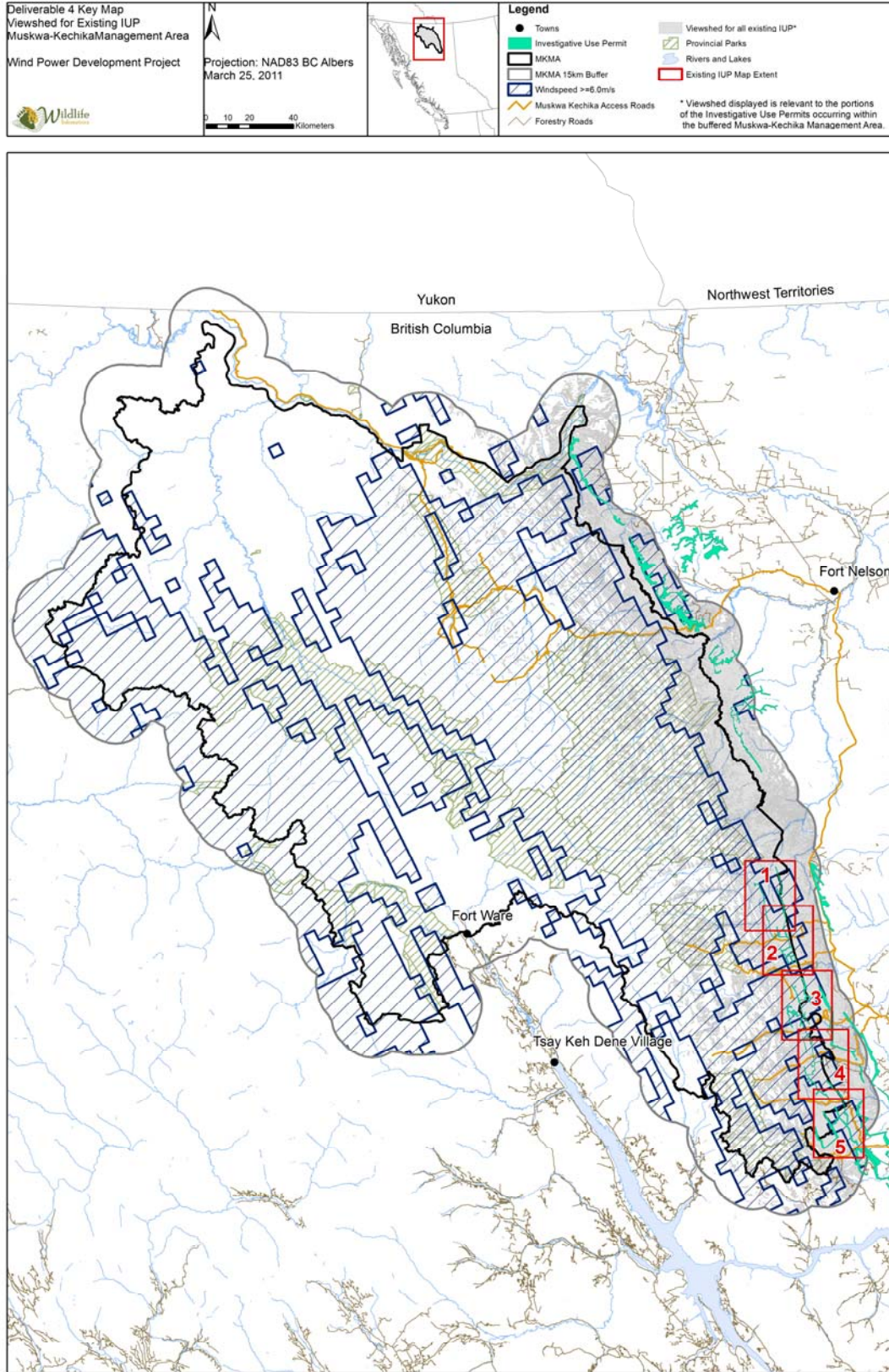


Figure 1. Key Map for the existing IUP composite maps.

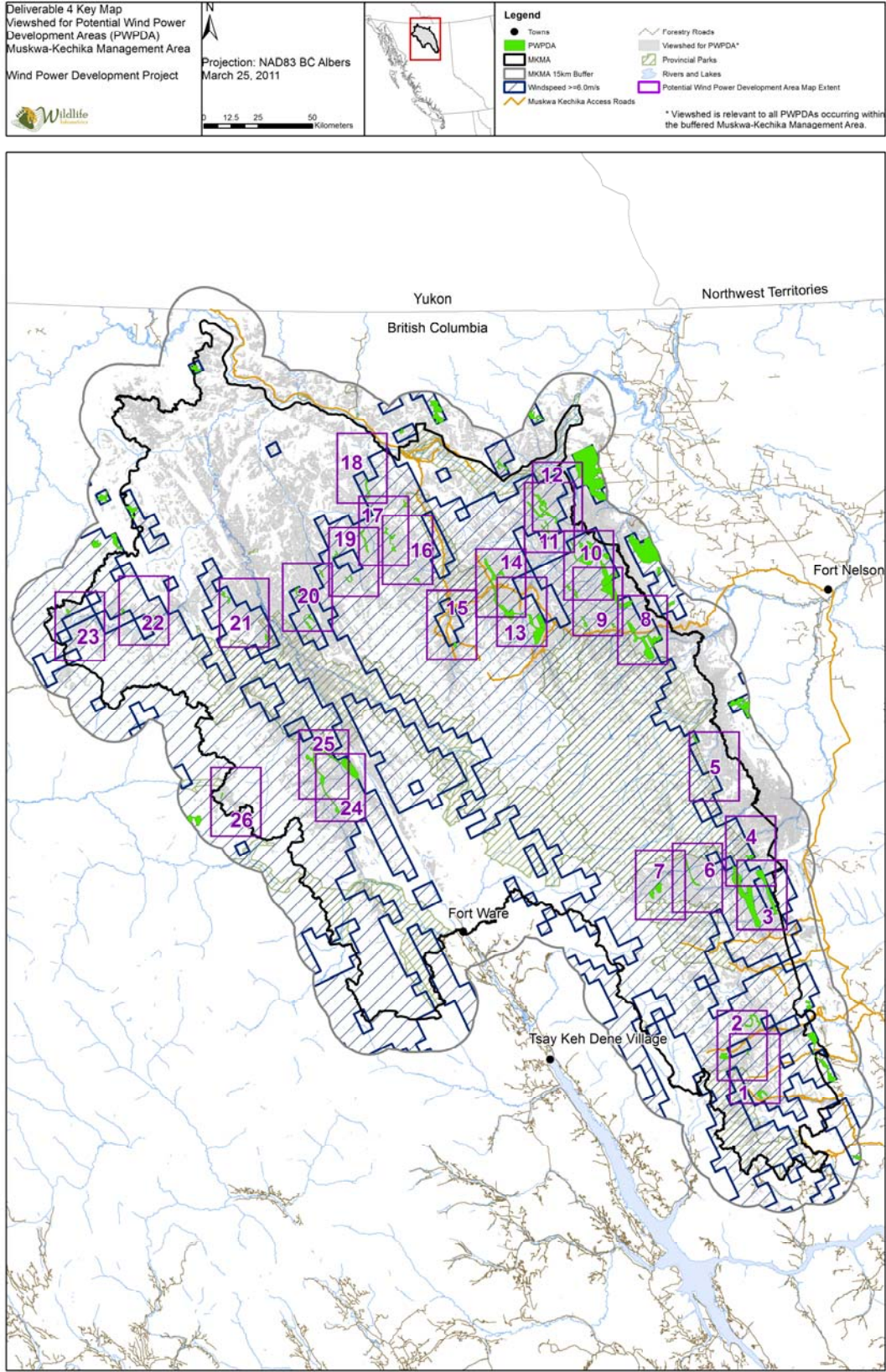


Figure 2. Key Map for the PWPDA composite maps.

METHODS

Viewshed Analysis

We used the Viewshed tool, available in ArcMap (ESRI, 2010), to identify the portion of the landbase that could be visible from the top of a wind tower. We defined the top of a wind tower to be the tip of a rotor blade; in the report *“Investigating Potential Impacts of Wind Power Development in the M-KMA – Physical Feasibility Model Methods and Spatial Data Summary”*² we identified the wind tower used for the project as the Vestas V90. The total height of this tower configuration was 135 meters where the hub height was 90 meters and the length of a rotor blade was 45 meters.

The Viewshed tool includes a number of parameters and options for controlling the visibility analysis such as adjusting the scope of view vertically and horizontally. Each of the parameters and options were evaluated and we concluded that many could remain as the default setting. The following parameters and options utilized were:

- The input point observer features where the wind tower locations for both existing IUPs and the PWPDAs were used;
- The option OFFSETA, a field which was added to the input point observer feature shapefiles to represent the tower height for a Vestas V90. The tower height was corrected to remove the tree height occurring in the same location as the tower. The Viewshed tool would take the value of the OFFSETA field and place it on top of the input digital elevation model (DEM), since the DEM had (Vegetation Resource Inventory) VRI tree heights added to it the tree height had to be removed from the tower height;
- The input raster which used the DEM with added VRI tree heights;
- The earth curvature correction and refractivity coefficient which was enabled. We selected to use the earth curvature correction and refractivity coefficient instead of using the flat earth option after conducting a test to see the difference between the two options. A comparison of the two results showed that a larger area was visible to the wind towers using the flat earth option compared to the more limited viewshed result using the correction for earth curvature and refractivity coefficient.

The viewsheds were processed individually for all existing IUPs and PWPDAs occurring within the M-KMA and the 15 km buffer to identify the visual impact of the towers on the M-KMA. The result from the viewshed tool identifies what area can be viewed from the input observer point features.

² Snively, M. and V.J. Brumovsky. 2011. Investigating Impacts of Wind Power Development in the M-KMA – Physical Feasibility Model Methodology and Spatial Data Summary - Revision 2. Wildlife Infometrics Inc. Report No. 367. Wildlife Infometrics Inc., Mackenzie, British Columbia, Canada.

SPATIAL DATA SUMMARY

Please see Table 2 below for a listing of spatial outputs associated with this report.

Table 2. Spatial Data Listing

Spatial Data – Grids		
Filename	Source	Purpose
IUP#_view	WII	Viewshed output rasters for both existing IUPs and PWPDAs.

Spatial Data – Shapefiles		
Filename	Source	Purpose
all_potential_iup_viewshed_135_re_d_final	WII	All potential IUP viewsheds converted to shapefile format, appended together and dissolved to form one polygon for mapping purposes.
all_existing_iup_viewshed_135_re_d2	WII	All existing IUP viewsheds converted to shapefile format, appended together and dissolved to form one polygon for mapping purposes.

LITERATURE CITED

ESRI. 2010. ArcMap. Environmental Systems Research Institute, Redlands, California.