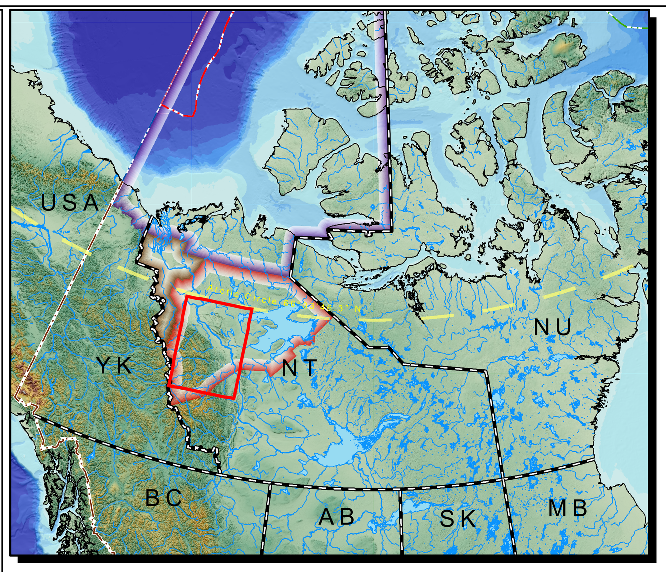
Available Areas for Expression of Interest within the Central Mackenzie Valley 2018



The following introduction and methodology are taken directly from the NTGO: NWT Open File Report 2005 - 004, for the purposes of clarity and preservation of the contextual material. Hydrocarbon potential map citations are also directly taken from the original publication.

Introduction

This is a qualitative map of comparative hydrocarbon potential in the Northwest Territories. It is not meant to be, nor should it be interpreted as, a rigorous, detailed, or quantitative resource assessment of hydrocarbon potential. The main purpose of this map is to complement ecological-themed maps in broad scale planning for, and identification of, potential protected areas (Northwest Territories Protected Areas Strategy, 2003). Industry users and community groups may also find it generally informative.

Methodology

The basic methodology used in this study is similar to Gal and Jones (2003). It is entirely qualitative and, because it is knowledge-based, is somewhat subjective in nature. Established and conceptual hydrocarbon plays were identified primarily from existing literature. A hydrocarbon play is defined as a family of hydrocarbon pools and/or prospects that share common geological characteristics and history of hydrocarbon generation, migration, reservoir development, and trap configuration (Reinson et al., 1993). Established plays are demonstrated to exist by virtue of discovered pools with established reserves. Conceptual plays do not yet have any associated discoveries, but geological analyses indicate the possibility of their existence (Reinson et al., 1993).

In this study, the identified plays are represented by and mapped according to the subsurface extent of possible reservoir rock. The reservoir rock is thus a proxy for the entire petroleum system. It is recognized that this is an oversimplification. However, mapping possible reservoir strata allows for a quick regional reconnaissance, using a relatively reliable dataset in a region that is largely under-explored, and in which few petroleum systems are fully understood or defined. The play areas are bounded by (near) horizontal planes (generally coincident with stratigraphic boundaries) and vertical boundaries are defined at faults, facies changes, erosional, or depositional subcrop limits. In map space, the plays are two-dimensional polygons. Individual play polygons are likely to overlap, as several possible reservoir formations may be layered within the sedimentary rock succession at a particular location. The overlaps and intersections of play polygons are then used to define smaller polygons. Each of these will include a number of (overlapped) plays. The number of plays and the play type (established or conceptual) included in a given polygon area is at the core of this assessment methodology. Simply put, if all other factors are equal, an area with three conceptual plays has more potential than an area with only one conceptual play. Established plays are given a higher weighting than conceptual plays.

The assessment criteria partly follow those of the Mineral and Energy Resource Assessment (MERA) process used by the Geological Survey of Canada (Scoates et al., 1986; Jones et al., 1992). These criteria are based on the overall geological favourability for the presence of oil and / or natural gas; the occurrence of established and conceptual hydrocarbon plays, indications of hydrocarbons (shows), and known accumulations. The presence or probability of mapped structural closures or other trapping features is accounted for, but only in a general sense in this broad based study. Equal weighting is given to both oil and gas. For a reconnaissance-scale study such as this, it is the number and type of plays present that dominantly contribute to the assignment of hydrocarbon potential. The criteria for rankings of very low to very high potential (Table 1) follow Gal and Jones (2003) and Gal and Lariviere (2004).

Table 1. Potential Ranking Criteria

Very High	Geological environment is favourable for oil and/or gas. Multiple plays, at least one is established. Closures identified and mapped. Significant accumulations are known.
High	Geological environment is favourable for oil and / or gas. Multiple plays. Closures identified and mapped. Known hydrocarbon occurrences.
Moderate to High	Geological environment is favourable for oil and/or gas. At least three plays. Closures identified and mapped for at least one play.
Moderate	Geological environment is favourable for oil and/or gas. One or two plays. High probability of blind structural / stratigraphic closures.
Low to Moderate	Geological environment is mainly favourable for oil and / or gas. At least one conceptual play. High probability of blind structural / stratigraphic closures.
Low	Some aspects of geological environment are favourable for oil and / or gas. Significant probability of blind structural / stratigraphic closures.
Very Low	Unfavourable geological environment.

The Map

The map illustrates the locations within a portion of the Mackenzie Valley where expressions of interest will be accepted for the purposes of oil and gas exploration. Current oil and gas rights: significant discovery licences and exploration licences are shown in the context of hydrocarbon potential. The specific areas where expressions of interest will be accepted are illustrated by the oil and gas grid (grid, sections and unit ares). The unit areas which are the smallest squares on the map show the smallest divisible area of land where a piece of land can be licenced for oil and gas exploration leading to signficant discovery and or production. If an expression of interest for any particular section does not fully contain all the units within the section, or sections within a grid, the grid, section and units must be referencing must still be used to provide a full legal land description of the parcel to the government of the Northwest Territories.

When referencing parcels of land the grid and section must be given. If only portions of a section, i.e. the units, are wanted for an expression of interest or bid then those units within the section must be specificied. A parcel of land needs to be described with the grid, section and the units in the following style:
[grid: 65-10 N, 126-00 W; sections: 51, 61, 62 (A, B, C, D), 71, 72 (A, B, C, D, E, F, L)]. This example is a reference only and does not reflect any suggestion by the government of the Northwest Territories of where to express interest in other areas that are open for an expression of interest.

The polygons representing hydrocarbon potential are thematically coloured to reflect comparative hydrocarbon potential into three aggregated categories from the original seven of: (very low, low, low - moderate, moderate, moderate - high, high, very high) to three clases: (very low - low, low - moderate / moderate / moderate - high, high - very high). Oil and gas land parcels administered by the Government of the Northwest Territories (GNWT) are thematically symbolized into categories for exploration, significant discovery and production licences. The settled land claim areas for the Inuvialuit, Sahtu and Gwich'in are indicated with gradational boundary shading. Polygons indicated by a line pattern fill boundary depict the locations where first nations surface and surface / sub-surface rights are located. The shaded relief component of the main map utilizes the USGS NED product which has a spatial resolution of 1 arc-second.
The locator map uses the GMTED 2010 product which as a spatial resolution of 7.5 arc-seconds for the land shaded relief, and a combination of the IBCAO product, which has a spatial resoluton of 30 arc-seconds in offshore areas and the ETOPO1 product which has a spatial resolution of 1 arc-minute for the offshore areas.

Oil and Gas Rights and Grid References:

A reproduction of the original 1980s representative figure illustrating the Oil and Gas Grid system in the Northwest Territories has been created for inclusion in this map. The original illustration can be found via the following URL:
http://www.aadnc-aandc.gc.ca/DAM/DAM-INTER-HQ-NOG/STAGING/texte-text/rm_ri_sd_oggrid_pg_1361197570920_fra.pdf
At the time of the creation of the original graphic the Northwest Territories and Nunavut were one territory.
The Natural Resources Canada Oil and Gas Grid reference system can be found via the following URL: http://www.nrcan.gc.ca/earth-sciences/geomatics/canada-lands-surveys/11092#OilGasData
1:1,000,000 Atlas National Framework basemap data was compiled from Natural Resources Canada and can be found via the following URL:
https://www.nrcan.gc.ca/earth-sciences/geography/topographic-information/free-data-geogratis/download-directory-documentation/17215
The Northwest Territories oil and gas rights GIS data can be found via the following URL: http://www.iti.gov.nt.ca/en/services/oil-and-gas-gis-data

Hydrocarbon Potential Map Citation:

Gal, L.P., 2005. Hydrocarbon Potential Ranking Map of the Sahtu and Gwich'in Settlement Areas, Map 1 of 2; Northwest Territories Geoscience Office, NWT Open File 2005-04, 2 maps, scale 1:1,000,000.

Original NTGO Hydrocarbon Potential Map Reference Citations:

Fischbuch, N.R., 1984. Facies and reservoir analysis, Kee Scarp Formation, Norman Wells area, Northwest Territories; Geological Survey of Canada, Open File 1116.

Gal, L.P. and Jones, A.L., 2003. Evaluation of oil and gas potential in the Deh Cho territory; C.S. Lord Northern Geoscience Center, Yellowknife, NWT. NWT Open File 2003-03, 88 p.

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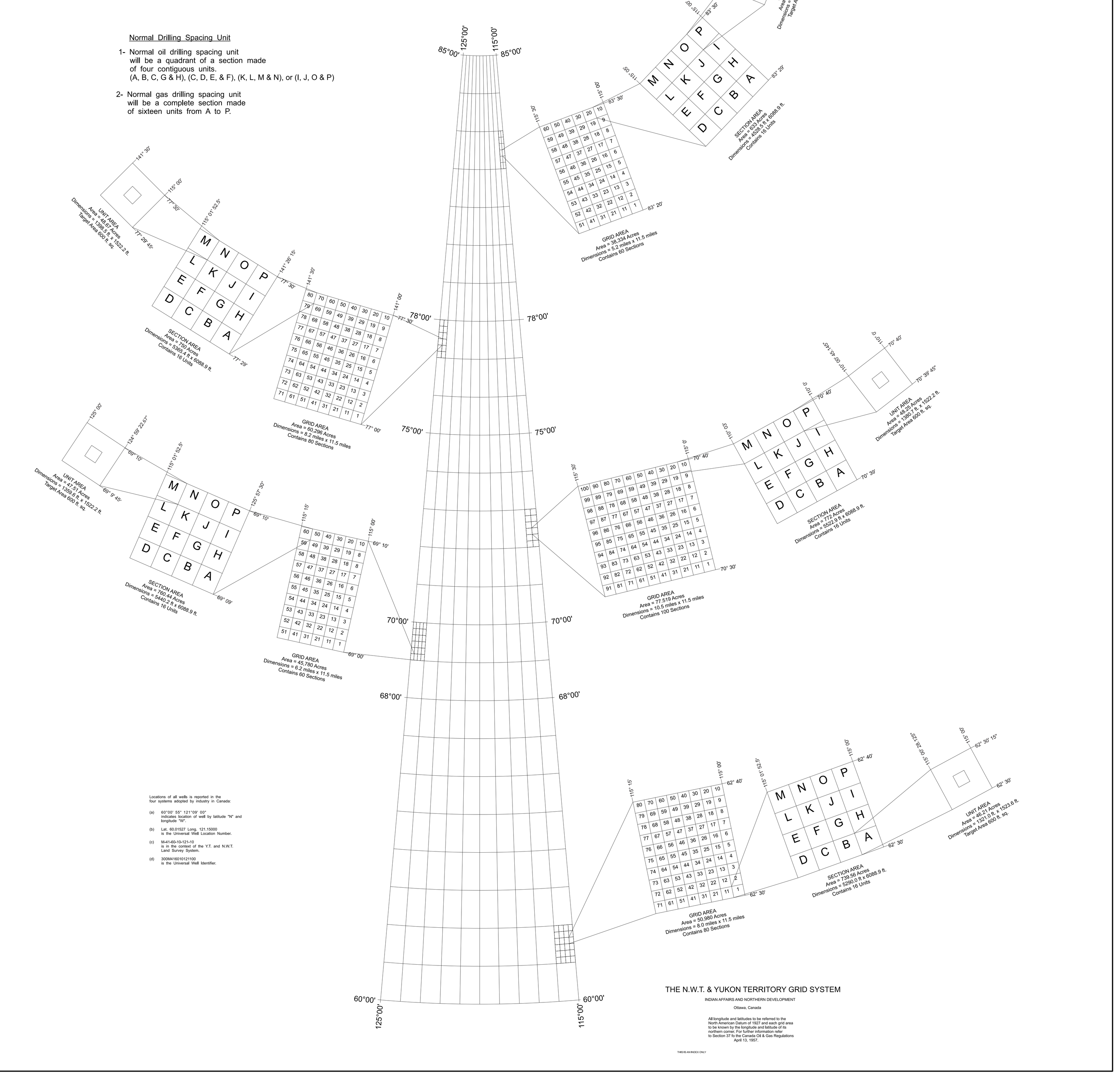
Digital Elevation Model Citations:

Danielson, J.J., and Gesch, D.B., 2011, Global multi-resolution terrain elevation data 2010 (GMTED2010): U.S. Geological Survey Open-File Report 2011–1073, 26 p. http://pubs.usgs.gov/of/2011/1073/

Amante, C. and B.W. Eakins, 2009. ETOPO1 1 Arc-Minute Global Relief Model: Procedures, Data Sources and Analysis. NOAA Technical Memorandum NESDIS NGDC-24. National Geophysical Data Center, NOAA. doi:10.7289/V5C8276M [access date]. http://www.ngdc.noaa.gov/mgg/global/global.html

Archuleta, C.M., Constance, E.W., Arundel, S.T., Lowe, A.J., Mantey, K.S., and Phillips, L.A., 2017, The National Map seamless digital elevation model specifications: U.S. Geological Survey Techniques and Methods, book 11, chap. B9, 39 p., https://doi.org/10.3133/tm11B9

U.S. Geological Survey, The National Map, 2016, 3DEP products and services: The National Map, 3D Elevation Program Web page, accessed September 6, 2016 at https://nationalmap.gov/3DEP/3dep_prodserv.html.



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Government of Northwest Territories

Natural Resources Canada, 1:1,000,000 Atlas Basemap

- Communities
- Line Delimiting the Arctic Circle
- Limit of Exclusive Economic Zone 200 Nautical Miles Offshore from Baselines Defined in Territorial Sea Geographical Coordinates Order
- Limit of Exclusive Economic Zone Pursuant to Bilateral Boundary Agreement
- Limit of Exclusive Economic Zone Pursuant to International Agreement with Denmark
- International Boundary
- Line Eextending from the 200 Mile Limit to the North Pole
- Provincial or Territorial Boundary
- State Boundary

Roads
- Expressway / Highway
- Freeway
- Other Roads
- Winter Roads

- River
- Lake
- Norman Wells Proven Area
- Proposed Mackenzie Valley Pipeline Route
- Oil and Gas Grids - Aboriginal Subsurface Lands
- Oil and Gas Sections - Aboriginal Subsurface Lands
- Oil and Gas Units - Aboriginal Subsurface Lands
- Unconstrained Oil and Gas Grids - GNWT Subsurface Lands
- Unconstrained Oil and Gas Sections - GNWT Subsurface Lands
- Unconstrained Oil and Gas Units - GNWT Subsurface Lands

Aboriginal Owned Lands
Property Rights
- Surface/Subsurface
- Surface

Indigenous and Northern Affairs Canada
Oil and Gas Rights
- Exploration Licence
- Pioneer Production Lease
- Significant Discovery Licence

Northwest Territories
Oil and Gas Rights
- Exploration Licence
- Significant Discovery Declaration
- Significant Discovery Licence
- Production Licence
- Pioneer Production Lease

Hydrocarbon Potential
- High - Very High
- High / Moderate - Moderate - Moderate / Low
- Low - Very Low

Depth in Metres
- < -50 - 25
- < -200 - -50
- < -500 - -200
- < -750 - -500
- < -1,000 - -750
- < -1,500 - -1,000
- < -2,000 - -1,500
- < -2,500 - -2,000
- < - 3,500 - -2,500
- < -5,000 - -3,500
- Inuvialuit Settlement Lands
- Gwich'in Settlement Area
- Sahtu, Dene and Metis Settlement Area

Elevation in Metres
6000, 5500, 5000, 4500, 4000, 3500, 3000, 2500, 2000, 1500, 1000, 500, 0