

# **THE DEVELOPMENT OF AN ECOLOGICAL LANDSCAPE MODEL FOR OIL AND GAS BEST MANAGEMENT PRACTICES – THE INTEGRATION OF BIODIVERSITY AND THE OIL AND GAS INDUSTRY IN THE NORTH**

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## **Abstract**

The Oil and Gas and Mineral Resources Division of the Yukon Government is developing an Ecological Landscape Model for oil and gas exploration and development Best Management Practices. It is being developed as a web-based product linking resource information, identified resource values, resource management objectives and Best Practices for the different regions in the Yukon. The model is intended to allow the integration of a viable economic oil and gas industry with the conservation of Yukon's biodiversity, as well as ensure that competitive economic and subsistence interests are considered in the planning, management and implementation of oil and gas activity. Using this model will help ensure that the standards of care being applied in the north are at a landscape level that can reflect regional ecological, social, cultural and economic values.

## **Introduction**

It is not possible to forecast the pattern of potential oil and gas development in the Yukon with any accuracy due to uncertainties associated with the definition of the underlying geology and the ability to transport oil and gas to market. However, the potential for development of oil and gas reserves exists. Hand in hand with the renewed interest in the development of Yukon hydrocarbon reserves is the concern about potential cumulative effects as patterns of development emerge and the intensity of human activity increases.

At the same time, the oil and gas industry is facing a new set of challenges as a result of changes in the global geopolitical and economic climate and as industry moves into more and more remote and sensitive areas like the Canadian north. Competing values and interests and the need to determine how lands and resources should be used are the primary sustainable development challenges faced not only by resource managers but also by resource users.

A changing perspective on appropriate land uses as well as increased pressure to provide alternatives which are less reliant on fossil fuel development affects not only the industry perspective of the land base but also the way on-site activities are managed. These changes and responses hold important implications for the way in which oil and gas companies manage the lifecycle of

their operations and influence innovation and creativity in management practices.

## **A Yukon Oil and Gas Framework**

About 94 percent of the potential petroleum resources in Yukon are owned by the Crown, the remaining six percent is owned by First Nations <sup>(fig 1)</sup>. Private companies gain access to the resource rights through tenure agreements with the Yukon Government or the applicable First Nation Government. These tenure agreements, or subsurface rights, give companies the exclusive right to drill for and extract oil and gas in a specified area. The rights may apply to all deposits within the specified area, or may be restricted to specific depths or type of product (oil or gas).

The disposition of oil and gas rights is awarded through an open competitive bidding process. Companies request areas to be posted but oil and gas rights are ultimately awarded to the highest bidder.

Oil and gas rights do not include rights to surface access. Companies must separately obtain permits, licences and various approvals for surface activities such as exploration camps, seismic exploration, exploratory and production drilling, pipeline development and road construction.

The Yukon Government reviews proposed allocation of oil and gas rights in order to identify potential impacts on the environment as well as social, economic and other issues related to conflicting land uses. This allows major concerns and issues relating to the proposed locations to be identified through consultations with First Nations, stakeholders and the Yukon public before putting areas up for competitive bid.

A current tool for managing concerns identified during the disposition process and prior to the regulatory process, is the identification of these concerns in the call for bids information and the inclusion of terms and conditions in the documents awarding a disposition. An example of information that might be included in a call for bids or disposition document might be the identification of sensitive wildlife habitat which may impose industry restrictions on type of access or time of year of operation.

An environmental assessment is not done at this stage because an oil and gas disposition does not automatically grant a right to conduct activities that create an environmental impact and because the project location and scope have yet to be defined by the proponent. The pertinent issue at the disposition stage is whether a location is subject to any restrictions based on land status (e.g. land claims, legislated withdrawals, land use plan restrictions) or unique sensitivities or risks that must be managed by the proponent and which may influence the likelihood of a project proceeding or not. Projects, once the scope and location are defined by the proponent and the accompanying regulatory instruments are

identified, will be screened under an environmental assessment process and licences or permits may be issued which contain conditions respecting where, when and how work can be done.

### **Defining the Problem and Identifying a Solution**

Disposition consultations in the Yukon in the past few years have identified a broad range of habitat, terrain, species and competing interest issues. Key issues include protection of the wintering grounds of the porcupine caribou herd and key habitat of woodland caribou herds, working in wetlands, permafrost and discontinuous permafrost regions, likelihood of cumulative effects relating to seismic exploration methods and potential conflict with the wilderness tourism and trapping industries.

During review of these issues, the discussion did not centre on how to prescriptively manage oil and gas activities. It was about how to define and meet management objectives for the identified resource values and issues and measure success in meeting those objectives. For example, it was recognized that reducing the line width on seismic lines alone would not meet the objectives of maintaining woodland caribou habitat function and biodiversity, herd and habitat productivity, or a sustainable harvest.

We know that observations of caribou indicate varying degrees of sensitivity to human disturbance and that different races of caribou and different herds may exhibit differences in sensitivity to disturbance. Sensitivity may also be affected by local environmental conditions, seasonal variations of things like snow depth, the type of activity in which they are engaged prior to disturbance, herd size, group composition and the nutritional status of the herd.

Because we know that caribou respond to industrial activity/human activity to different degrees depending on a range of factors, best practices that mitigate impacts on caribou must also reflect this awareness. Seasonal control of activity, control of human behavior, and awareness of critical times of sensitivity and critical habitat must be taken into account when choosing the appropriate practices for the value at risk. It is not sufficient to simply prescribe direction on line width or to manage only one species.

This led to the development of an Ecological Landscape Model for oil and gas best management practices (BMPs) <sup>(fig 2)</sup>. The model is intended to allow industry, regulators and stakeholders to define resource management objectives, identify and define resource values and issues and propose mitigative strategies in a value-free or pre-project setting.

Because ecological knowledge is required for effective management, the model also evaluates topographic and ecosystem sensitivity, wildlife and fisheries species diversity, significance of key management species and habitat, and social, cultural and economic considerations. Knowledge gaps and research

needs are identified and the expectation that industry, government, First Nations and the academic world are partners in understanding and filling these knowledge gaps is clearly laid out.

### **What are BMP's?**

BMPs are defined in this context as any kind of existing or new practices that will reduce the time, intensity or duration of the footprint or effect on the land base and/or the users of that land base.

By their nature many specific BMPs soon become obsolete as 'better' BMPs become available but the objectives and concept behind the examples given usually remains valid. It is therefore important to understand not so much what is being recommended but why it is being recommended. The BMP model indicates a desired goal or objective and some current ways to approach this goal, with the unique biological and physiographic sensitivities of the area helping dictate the practice, leaving the way open for immediate implementation of newer and better ways as they become available.

Articulating and identifying overall landscape level management objectives at appropriate spatial and temporal scales will assist industry to better understand the environment in which they work.

BMPs should be consistent and comparable in nature and scope with successful measures already undertaken in equivalent areas in which all the scientific data are available and results understood. At the same time scientific research and examination of scientific developments should be continued with a view to obtaining more complete data. As scientific understanding and social values change over time, so the scientific and value-based choices presented in the model will be revisited.

While use of objective based BMPs indicates a move away from prescription-based command and control to the use of co-management, economic instruments, incentives, sanctions and self-regulation, this tool will not replace the regulatory process. It is intended to supplement existing regulatory requirements especially where those requirements are either too prescriptive in nature to deal with special needs or unique features, or too generic in nature to provide specific assistance or guidance to industry. BMPs should not be regarded as either exhaustive or restrictive. Nor would they preclude the need for additional or different information for a particular project.

### **A Regional Approach to Development of Best Management Practices - Transboundary Considerations.**

One biological fact that pertains to ecosystems at all scales is that change is inevitable. Natural change such as forest fire, landslides, drought, severe

winters and deep snow can create both local and regional level effects, as well as short-term and long-term effects. While change from natural forces is the norm, change associated with certain types and levels of human activity can harm the capacity of the broader ecosystem or ecoregion to function well and manage natural change. While species abundance is one measure of ecological health, so too is the ability of the whole ecosystem to function.

Certainly one issue with a regional approach based in part on jurisdictional control is that the broader context could be lost and common activities in common ecosystems may be dealt with differently from one territory or province to another. While this would best be addressed through a coordinated approach that reflects a comprehensive understanding of ecological relationships across territorial, provincial, and international boundaries, looking to the lessons learned in neighboring northern jurisdictions and building strong working relationships with Alberta, BC, NWT and Alaska is also a valuable tool.

### **Relationship to Integrated Resource Management, Sustainable Development and Cumulative Effects Management in Yukon.**

The reconciliation of competing values and interests to determine how land and resources should be used is one of the principal challenges for sustainable development. This challenge is sometimes framed as a conflict between development and conservation interests and uses. Sustainable development requires the incorporation of activities which have economic and social value, such as oil and gas exploration and wilderness tourism, and other values such as biodiversity and public wilderness expectations into our overall strategies for the use of lands and resources. It is generally recognized that in order to achieve sustainable development an integrated approach to land and resource management will be required.

A fundamental principle of integrated landscape or resource management is that industrial activities are inter-related, and that the key to reducing the ecological footprint is to coordinate activities at the landscape level. Linear and non-linear "footprints" are unique to a particular industry and at the same time generic to all kinds of resource extraction based industries. (e.g. access roads and exploration camps). The need to ensure that all Yukon operators are using the same information and that the information is appropriate to the landscape in which the operator is working was one of the incentives for this project.

An important consideration with the development of BMPs is the modeling and forecasting of cumulative effects. The application of BMPs can help ensure that multiple effects of the various sectors are not considered in isolation or without accumulation across sectoral lines. Objective based thinking and planning from an ecosystem perspective allows consideration of timing and duration of effect, acceptability of recovery (reversibility of effect), and implications over the long term. Understanding the implications of longer term changes to sustainability could provide an incentive for the energy, forestry, agriculture and mining

sectors to begin to discuss each other's activities and see how they can work together. In this way the competitive effects of the various land uses can be reduced.

Coordination of activities and collaboration between companies and between industries is key to the success of this BMP model. Cooperation is needed at the operational level, where companies can make the sophisticated assessments necessary to make a difference. This BMP model supports greater integration of decision making at the landscape level and promotes intra/inter-industry, departmental and governmental cooperation <sup>(photo 1)</sup>.

The development of a best practices guide is only a part of a broader framework that is needed to address the full range of land use values and interests across large temporal and spatial scales. Other tools include land use planning and cumulative effects management. For industry to be truly effective on the ground public policy around integrated resource management is needed. Governments play the critical policy role in setting the overall resource development and environmental priorities for the land base and for developing the policy frameworks to guide the long-term direction of resource development and integrated resource management.

## **Conclusion**

The Ecological Landscape Model for oil and gas best management practices is intended to be used by industry as well as regulators. It is intended to provide information to the public on current oil and gas industry best practices both in general and within a unique northern landscape, and to promote a better understanding of responsible environmental stewardship and sensitivity to community interests in oil and gas exploration and development in the north.

Like most guidelines used in natural resource management, the objectives presented in the model and the suggested BMPs will be developed from a combination of scientific evidence and informed professional judgment. They represent an attempt to integrate society's desire both to generate a viable economic industry and to ensure the conservation of biological and habitat diversity in managed landscapes.

While this model has limitations, it marks a significant step towards responsible stewardship of all the resources within the identified regions in Yukon.

## **References**

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