

DEH CHO LAND USE PLANNING COMMITTEE
One Land One Plan



Ndéh Łié - Mek'ęę Ats'et'ı Łié
Dehcho Ndéhé T'áhagot'gha Sááhniogjáh-ké

The Economic Development Assessment Model 1.5

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Working Draft Revisions and Results

Deh Cho Land Use Planning Committee

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Introduction

The EDA Model was constructed for the Deh Cho Land Use Planning Committee to simulate the impact of major alternative land use options in the Deh Cho. The report "The Economic Development Assessment Model 1.0 (July 2004)", outlines the model structure, operating procedures and preliminary results. The model was presented at the summer 2004 round of consultations and included in the Draft Land Use Options Atlas (July 2004). Feedback and assistance was requested from planning partners to revise and improve the model.

Comments from consultations and formal written submissions focused on the value of such a model in the planning process and questions regarding its accuracy and structure. The EDA model's purpose is to assist planning partners with broad scale planning decisions, not for business planning decisions. No major revisions were required for Agriculture or Tourism, although new Consumptive Tourism operations were excluded from the Working Draft (WD) and Current Land Withdrawals (CLW) to reflect community interests. The GNWT requested a copy of the model in order to review the model structure. An outline of the Revisions for the Oil & Gas, Mining and Forestry sectors are presented below followed by results for the Working Draft, Current Land Withdrawals and Full Development scenarios. The level and extent of revisions reflects the contribution and interest of planning partners.

Oil & Gas Revisions

Key sector concerns related to the economic risks associated with Northern exploration, where infrastructure is limited and geological potential is poorly documented. The Committee contracted Ken Drummond of Drummond Consulting to produce a report "Oil and Gas Field Size Distribution of the Deh Cho Territory" to better determine the gas potential of the region. (http://www.dehcholands.org/reports_oil_gas_potential.htm)

The Committee used the map showing Remaining Recoverable Gas as the basis for revisions. More than 63% (92.7 Billion m³) of the 147 Billion m³ Remaining Recoverable Gas Resources (Drummond 2004) lie in quarter grids containing >50million m³ south of 61°30'. In the model this area is considered for exploration, given its relatively higher potential and proximity to infrastructure. Over the period resources become economic in steps of 5 grid squares northwards from the Alberta / BC border, every 5 years. This is staggered with grid squares containing >100million m³ / year being considered viable in the initial step with additional volume from grids squares containing 50-100million m³ becoming viable in subsequent 5 year steps as infrastructure is developed. For the purposes of modelling it is assumed production north of 61°30' is unlikely over the next 20 years given the current infrastructure and known reserves in the region.

The area south of 61°30' was divided into 3 general regions (Liard, Trout Lake and Cameron Hills) and appropriate costs and operational parameters established to reflect geological potential, relative costs and proximity to infrastructure. Sources included Operator Annual Reports, industry enquiries and research findings. Production well tie-ins assume 12.5 miles of 6 inch pipeline at \$350k per mile. The model factors in production declines of 40%, 20% and 30% for the 3 regions in the first year of production, dropping to 5% by the 5th year of production. Further assumptions are provided in the Table 1.

Table 1. Natural Gas EDA Model Assumptions

ITEM	LIARD	TROUT	CAMERON	Units
Seismic	55,000	55,000	55,000	\$/ well
Exploration Wells	32	224	115	No. of wells
Cost	15	3	2	million \$/well
Production Wells	8	31	23	No. of wells
Cost	10	3	1	million \$/well
Initial Production Rate (average)	10	5	5	mmcf/d/well
Operating Costs	6	6	6	\$/boe

The Full Development scenario assumes 62 new production wells would be developed south of 61°30' over the next 20 years. This assumes 371 exploration wells across the region and reflects the level of development observed south of 60°00'. In the Current Land Withdrawals and Working Draft scenarios the Full Development production volume is scaled according to the volume Available for exploration in the 3 regions (Liard, Trout Lake and Cameron Hills) compared to the Full Development scenario.

Mining Revisions

Comments from the mining sector focused on ensuring geological potential is reflected both in determining the potential and exploration risks. DCLUPC staff met with Malcolm Robb (DIAND) and Jianping Zhang and Diane Baldwin (GNWT) to establish appropriate scenarios. The GNWT also provided a potential diamond mine model and information on the Coates Lake property. Canadian Zinc provided a scoping study of the Prairie Creek property. Considerations included timeline for regulatory approval, existing dispositions and prevailing market conditions.

The model provides the option of running scenarios with different mines turned on or off. Under the Full development Scenario all the mines outlined in the table below were turned on to capture the broader potential of the region. For the purposes of modelling the Current Land Withdrawals and Working Draft scenarios existing dispositions (*) regardless of which zone they are in were assumed to go ahead. The Working Draft also assumed the Pine Point deposits would resume activity towards the end of the period.

Table 2. Mining Scenario used in EDA Model

Mine	Deposit Type	Start Date	Duration (years)	CLW	Working Draft	Full Dev.
Cantung*	Tungsten	2006	5-7	IN	IN	IN
Prairie Creek*	Lead, Zinc, Silver	2009	20 +	IN	IN	IN
South of Nahanni	Gold	2012	15			IN
Coates Lake*	Copper, Silver	2014	20-25	IN	IN	IN
Pine Point (Westmin Style)	Lead, Zinc	2015	7-10		IN	IN
Modelled after Tehera / Snap Lake	Diamond	2015	8-10			IN
Emerald	Gem - emerald	2015	8-10			IN

Forestry Revisions

DCLUPC worked closely with RWED to revise the forestry sector data. Summarization problems with the original data required new analysis to reflect actual saw log potential and appropriate development scenarios. RWED provided a Long Run Sustainable Yield Average for Aspen, White Spruce and Pine derived from mapped stands in the original PACTeam report, RWED inventories and spatial data on the distribution of Spruce Budworm data.

Spatial revisions changed the volume and distribution of saw log stands. Consequently the Delivered Log Cost Guide required complete revisions. Myers Norris Penny LLP (MNP) produced a new report entitled "Economic Parameters for Estimating the Delivered Wood Cost in the Deh Cho Planning Area". The report provided parameters for harvesting White Spruce and Aspen saw logs from 3 operating regions (Ft Liard, Ft Simpson and Enterprise). Scenarios are provided below.

The estimated resources in the region include 368,631ha (52,566,780m³) of White Spruce and 175,728ha (3,602,424m³) of Aspen. MNP (2005) indicate the annual allowable cut is less than 500,000m³ for a long run sustainable harvest. The scenarios are designed to reflect both this potential and the realistic level of development expected over the period given local capacity and appropriate silvicultural practices in the region.

The maximum or Full Development scenario assumed a peak annual production across the region of 105,000m³ (10,000m³ of Aspen and 95,000m³ of Spruce) in 20 years. Both Ft Liard and Ft Simpson each start with volumes of 5000 m³ of Aspen which continue through to year 20, reflecting existing operations and plans in Jean Marie River. This potential was not captured in the inventories so the model was adjusted accordingly. Spruce was chosen for "additional" increments in both regions, based on profitability. Enterprise harvests Spruce for years 1-20 reflecting existing permits.

Table 3. Forestry scenario used in EDA Model.

Year	<u>Aspen</u>	<u>Spruce</u>	<u>Annual Harvest in Yr 20</u>
Ft Liard	5000 m ³ /yr (years 3-20)	Increments of 5000 m ³ /yr every 2 yrs (years 5-20)	45,000 m ³ / year
Ft Simpson	5000 m ³ /yr (years 1-20)	Increments of 5000 m ³ /yr every 2 yrs (years 3-20)	55,000 m ³ / year
Enterprise		5000 m ³ /yr (years 1-20)	5,000 m ³ / year

For the Current Land Withdrawals and Working Draft scenarios, the Full Development production volume is scaled according to the volume available to harvest in the 3 operating regions (Ft Liard, Ft Simpson and Enterprise).

Results

These results compare the Working Draft, the Current Land Withdrawals and Full Development scenario over a 20-year period from 2005-2025. They capture the possible impacts of the land use planning decisions associated with each scenario.

The Full Development scenario illustrates the maximum level of development expected in the region over the period. All the potential is zoned as “Available” and the potential “Developed” in each sector is determined by assumptions including those outlined in the previous section and earlier reports.

In the Working Draft and Current Land Withdrawals the potential “Developed” is related to the potential falling within permitted zones and “Available”. For Tourism and Mining the potential reflects actual sites or deposits (except hypothetical mines illustrating wider potential). More potential falls within permitted use zones and may be “Developed” in the Working Draft compared to the Current Land Withdrawals. For Natural Gas, Forestry and Agriculture, the potential “Developed” is proportional to the area or volume “Available”. In this instance, the model may underestimate the potential “Developed” in the Working Draft and overestimate what might be expected under the “Current Land Withdrawals” because the Working Draft zoning is more closely related to areas of high potential.

From a regional perspective the “Available” potential or opportunities in all scenario’s, far exceeds the maximum which could realistically be “Developed” over the period. This is reflected in both Table 4 and the Charts 1, 2, 3, showing Developed and Available potential for Agriculture, Forestry and Natural Gas for the 20 year period. If we assume the Working Draft zones of “Available” potential are sufficiently large for businesses to plan development, the production level of the Full Development scenario’s should be achievable within the Working Draft zoning. Nevertheless, the model attempts to capture the likely impact of reducing “Available” potential on what is “Developed”.

Table 4. Potential Available and Developed in Scenarios Over 20 Years

LAND USE		LEVEL OF DEVELOPMENT		
		CLW.	WORKING DRAFT.	FULL DEV.
Agriculture	Available	1,092,913 ha	1,069,001 ha	1,841,244 ha
	Developed	89,605 ha	84,049 ha	146,209 ha
Forestry	Available	454,910 ha	421,184 ha	544,359 ha
	Developed	13,323 ha 845,362 m3	12,768 ha – 789,614 m3	15,649 ha - 1,136,770 m3
Natural Gas	Available	2,345,282 ha – 66.3 Billion m3	2,229,413 ha – 61.5 Billion m3	3,974,649 ha – 91.9 Billion m3
	Developed	11.4 Billion m3	10.8 Billion m3	17.3 Billion m3
	Developed	39 Production wells	37 Production wells	62 Production wells
	Developed	219 Exploration wells	206 Exploration wells	371 Exploration wells
Mining	Developed	Cantung, Prairie Creek, Coates Lake	Cantung, Prairie Creek, Coates Lake, Pine Point	Cantung, Prairie Creek, Coates Lake, Pine Point, Diamond, Gem, Gold
Tourism	Available	77 sites	117 sites	166 sites
	Developed	45 sites	72 sites	103 sites

Chart 1. Agriculture - Developed and Available Potential Over 20 Years

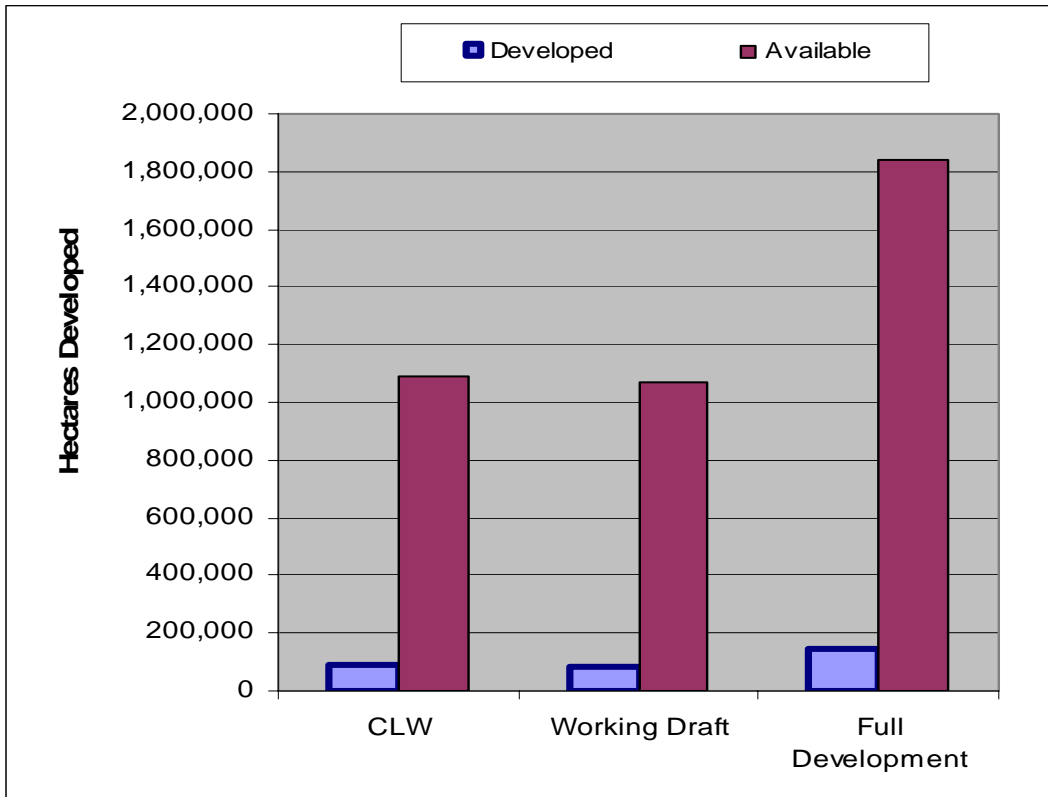


Chart 2. Forestry - Developed and Available Potential Over 20 Years

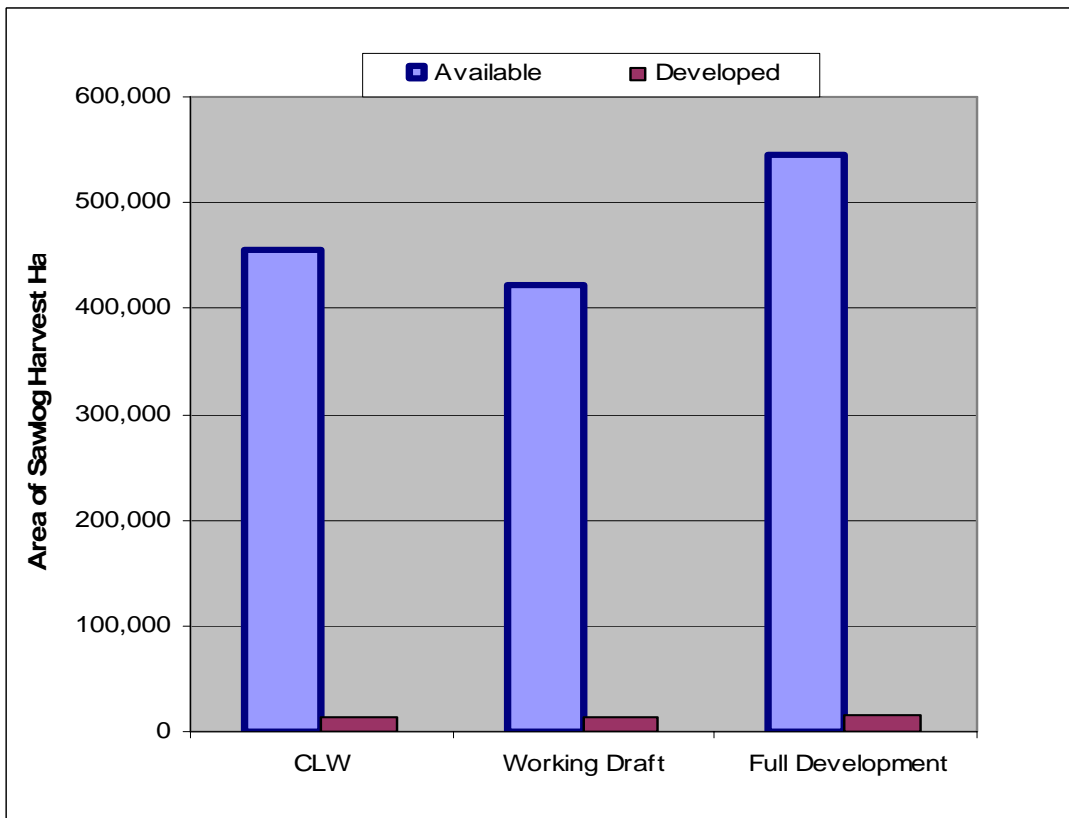
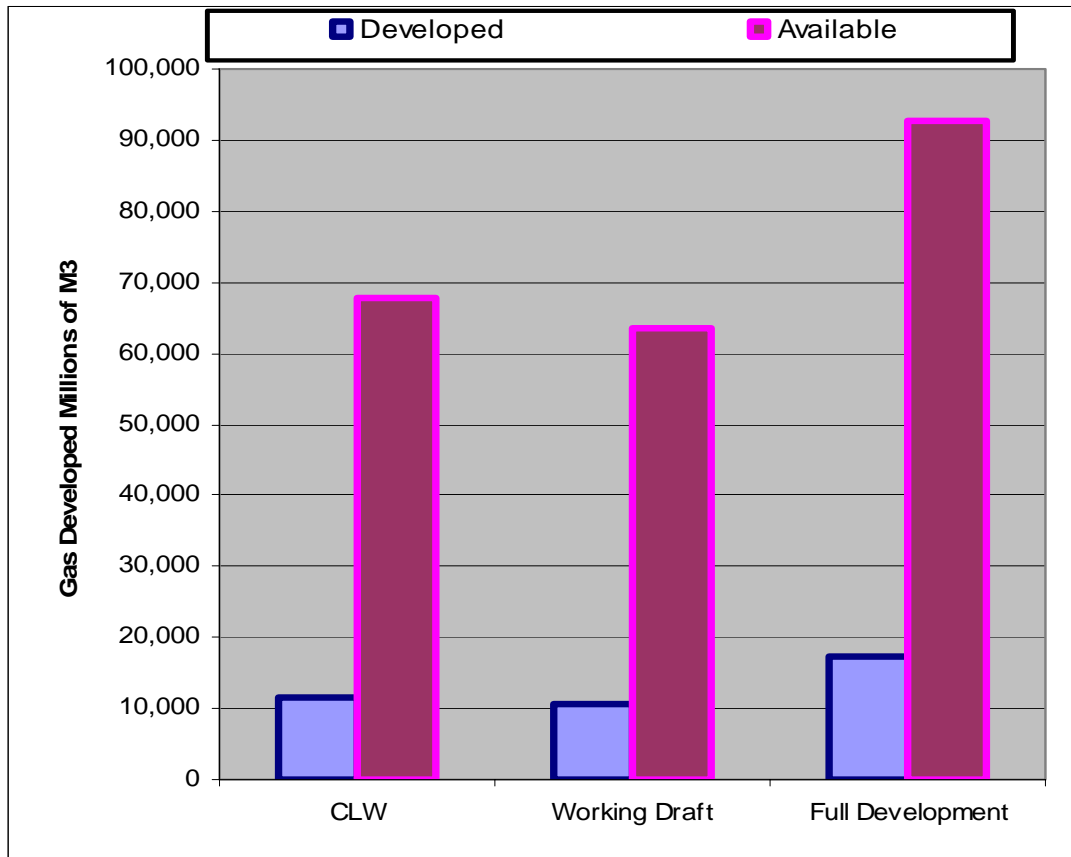


Chart 3. Natural Gas - Developed and Available Potential Over 20 Years



The Current Land Withdrawals scenario reflects the situation if the current zoning was maintained for the next 20 years. Similarly, the vision for the Deh Cho laid out in the Working Draft shows the results of alternative zoning. Neither of these appears to reflect what is happening on the ground and a significant increase in development would be required to achieve projected production levels. Many factors determine the actual level of development - the amount of infrastructure available, market values, changes in regulations, environmental issues, etc.

Political uncertainty over self government, resource revenue and land jurisdiction is currently a major impediment to development in the region. Through the Deh Cho Process negotiations, many of these issues will be addressed. The Current Land Withdrawals were established as an Interim Measure until negotiations are complete. All parties will have to approve the Land Use Plan and accompanying terms (represented in the Working Draft) before it can be implemented, therefore reducing the need for significant revisions in subsequent revision cycles. This will improve certainty to communities and developers alike and encourage development.

From the scenarios we can find a number of general trends. Higher levels of development lead to higher Gross Expenditure, Gross Domestic Product, Employment, Labour Income, Tax Revenues and Population Levels. This is illustrated by comparing for example the Gross Expenditure (Chart 4.) or the Gross Domestic Product (Chart 5) for the Full Development scenario with the Working Draft or Current Land Withdrawals. It is also born out of the high proportion of the Gross Expenditure (79%), Gross Domestic Product (90%), Employment (81%) and Labour Income (76%), directly related to development activities in each scenario.

Chart 4. Deh Cho Gross Expenditure Over 20 Years

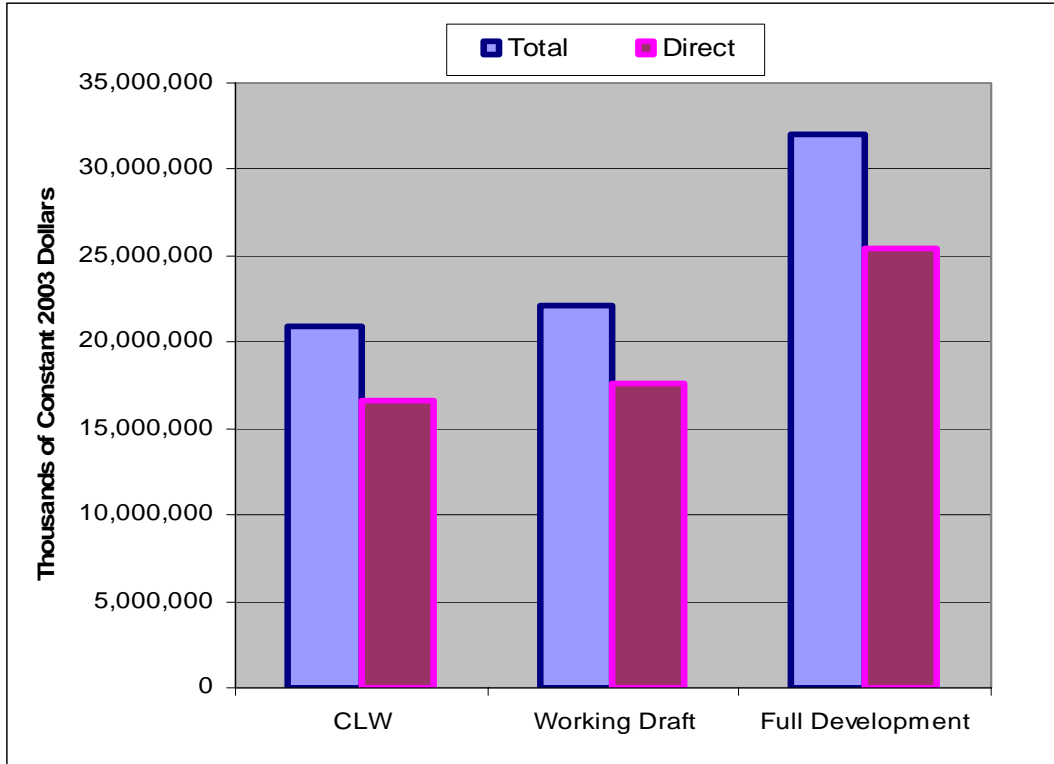
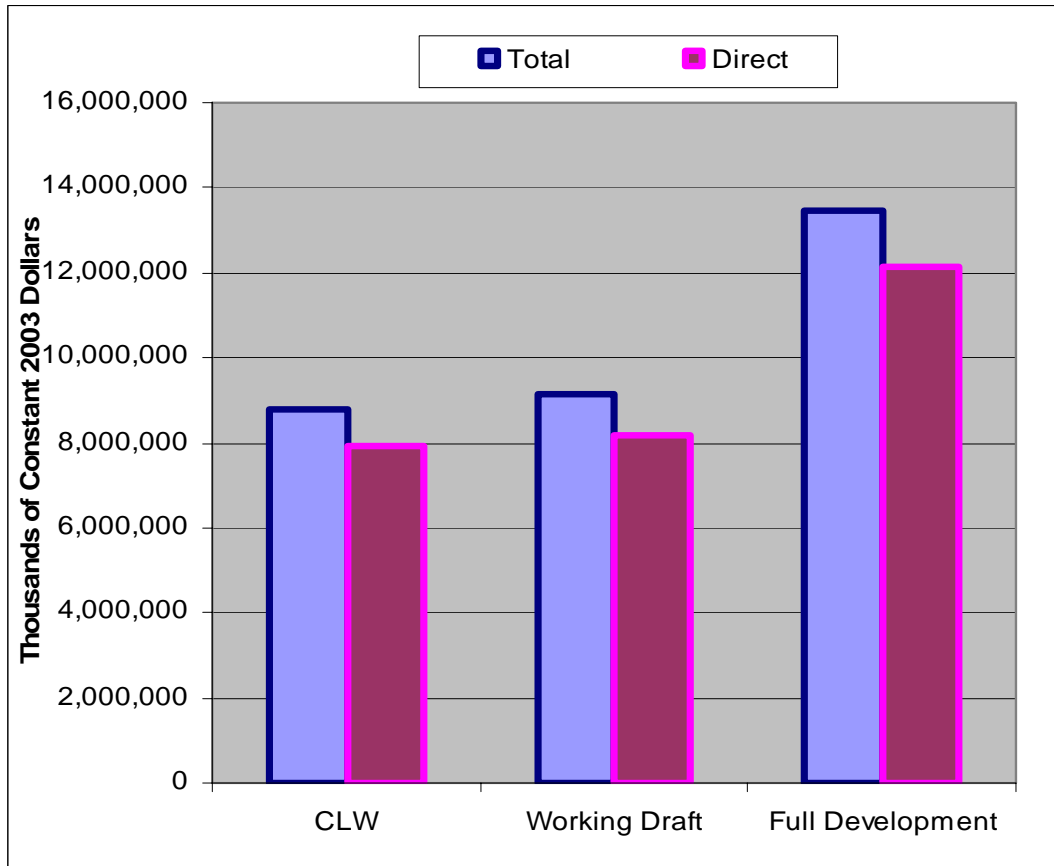


Chart 5. Deh Cho Gross Domestic Product Over 20 Years



The increasing performance of the economy over the period can largely be attributed to non-renewable resource development activities, particularly Mining and Oil & Gas. These sectors involve large capital expenditures and create employment. However, a range of factors must be considered in assessing which scenario would benefit the region.

Currently unemployment is estimated to be 20.7% of the whole Deh Cho region. This translates into approximately 1,035 people unemployed and wanting a job from a labour force of 5,006 people. There is a heavy reliance on the government sector for jobs, particularly in smaller communities. The major source of revenue for the region is federal transfer payments and other external funding sources.

The Deh Cho faces a number of challenges as the region moves towards a wage based economy. Increasing development will place significant demands on skilled labour and services in the region. This demand could easily absorb the supply of local people looking for this type of work with the necessary skills. This is illustrated in Chart 6 Direct Employment for the Working Draft, which indicates a significant number of Southern workers would be required to support the anticipated level of development. This is particularly noticeable with larger short term projects such as the Mackenzie Gas Project in the early years. This trend is observed in all scenarios as indicated in Chart 7.

Chart 6. Direct Employment - Working Draft Over 20 Years

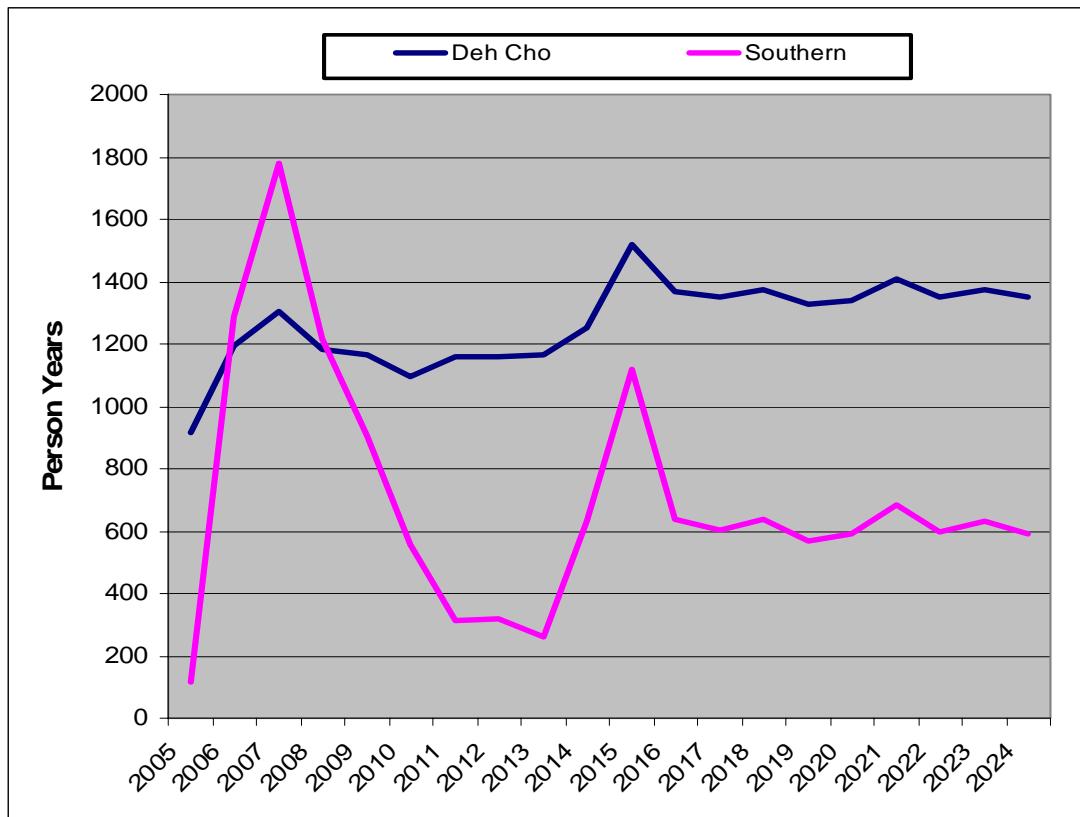
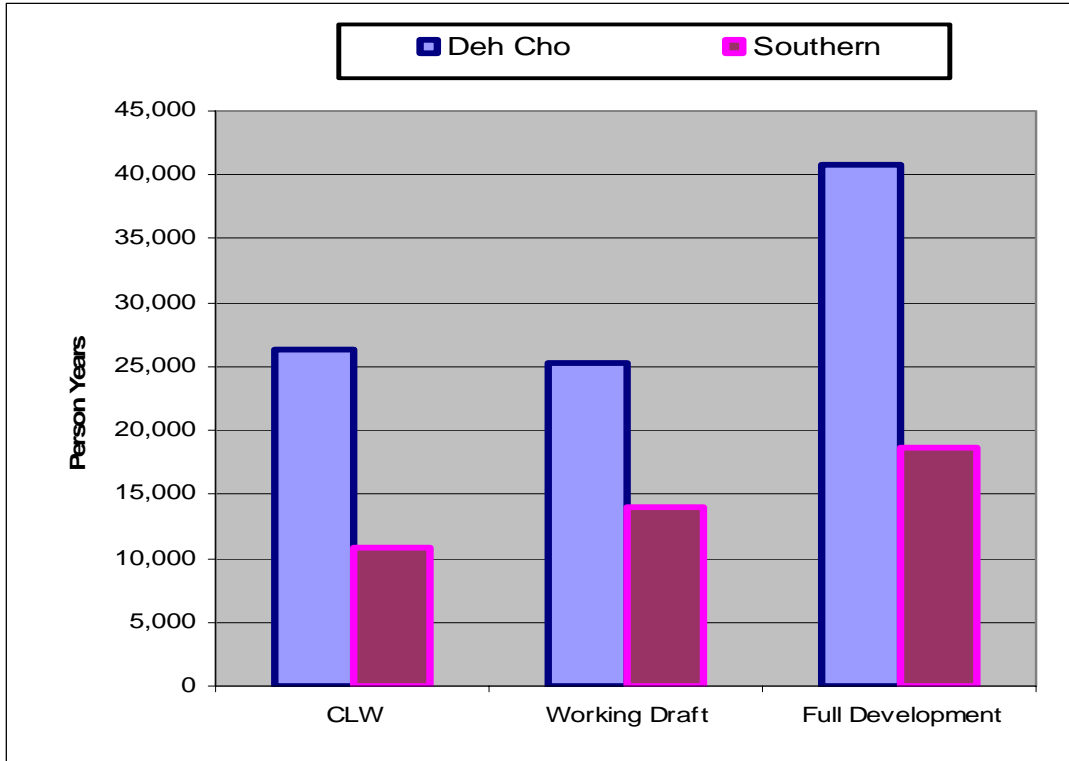
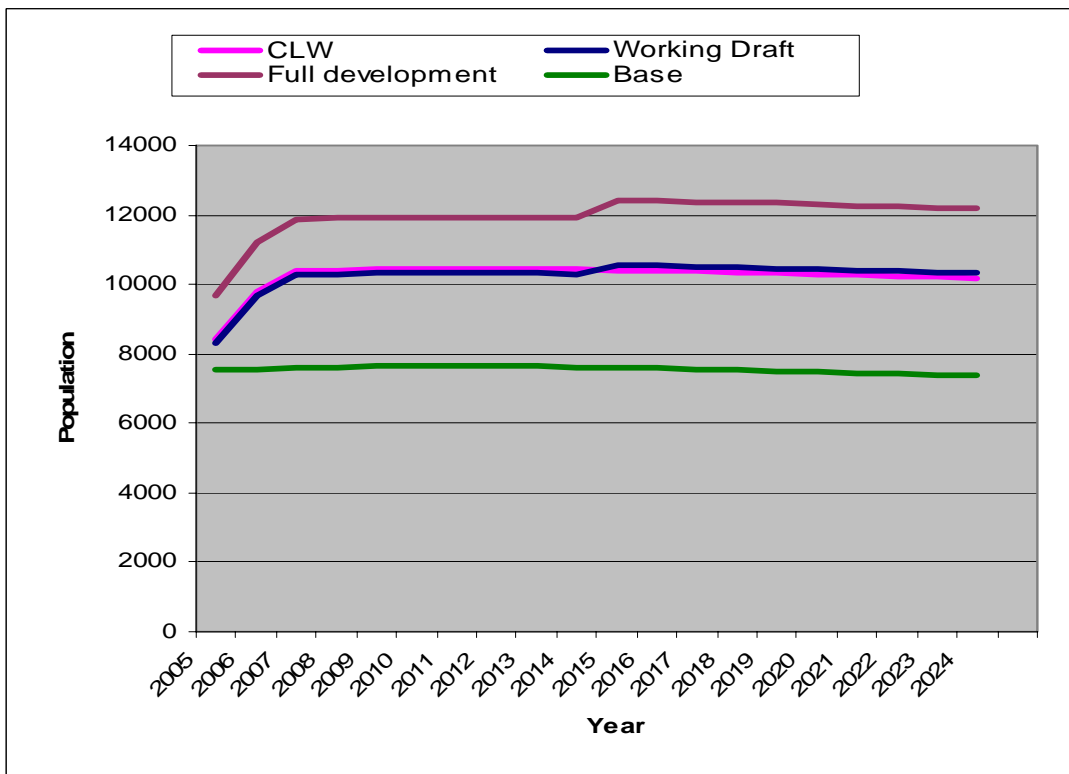


Chart 7. Direct Employment - Scenarios Over 20 Years



With sustained demand for labour the model predicts the population would increase by 35%, 37% and 61% for the Current Land Withdrawals, Working Draft and Full Development Scenarios (Chart 8.).

Chart 8. Change in Deh Cho Population Over 20 Years



Again this increase would be largely from Southern workers taking up residency in the region with their families, rather than natural increases. This is supported by projected Birth and Death Rates shown in Chart 9. Without in-migration of new residents, the Deh Cho population will eventually decline.

Chart 9. Deh Cho Projected Birth and Death Rates Over 20 Years

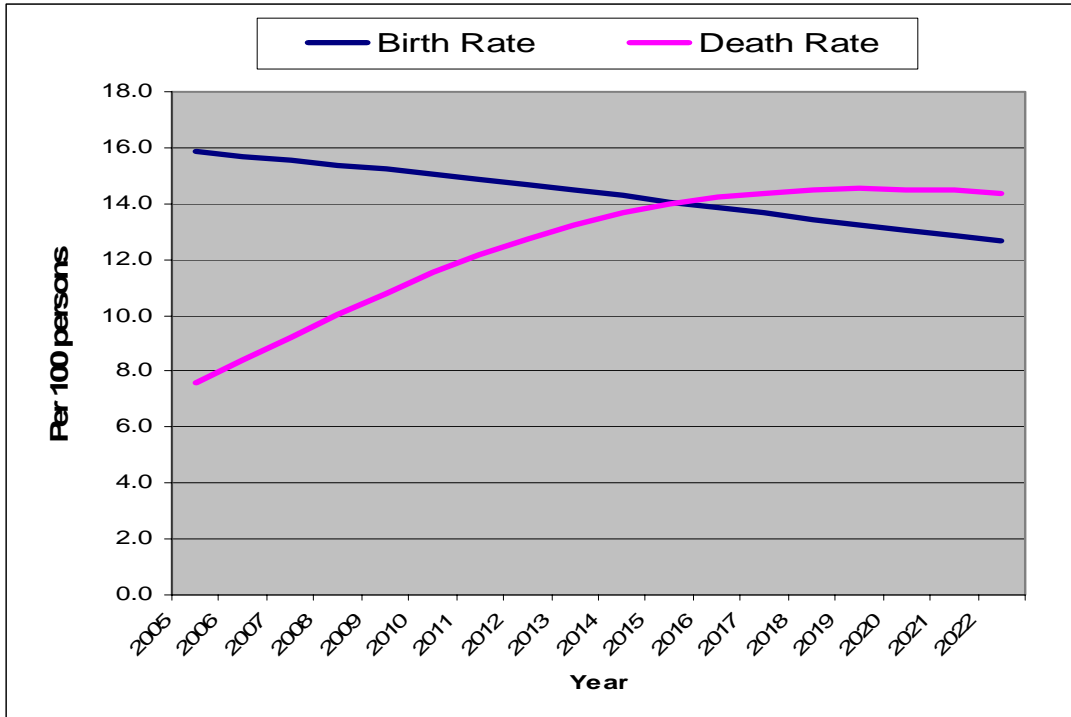
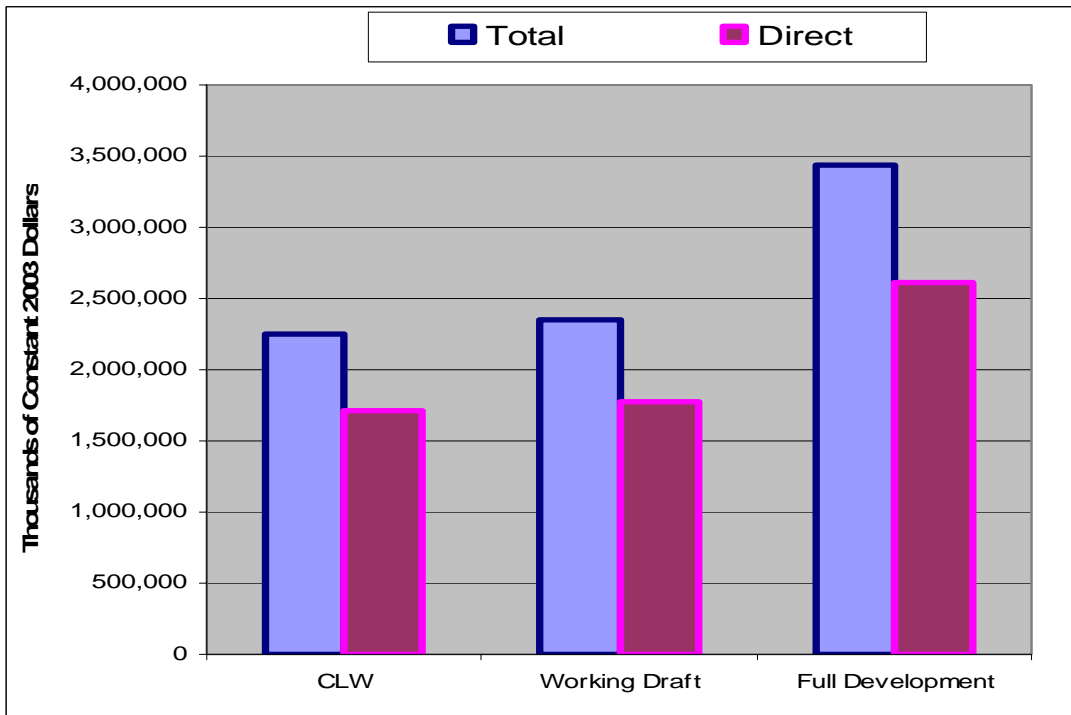


Chart 10. Impact on Deh Cho Labour Income Over 20 Years



Although the local labour force will not grow significantly, there will be opportunities for local people to move into higher paid jobs. Chart 10 - Impact on Labour Income, illustrates how jobs related to development generate the most income in the region. However, development also drives in-migration to meet specific labour demands. There will always be a trade off from development between generating new jobs, increased Labour Income and the in-migration of skilled labour. Education must become a priority if local people are to secure high skilled jobs with higher incomes and benefit from development. In this respect the model assumes an increasing participation rate (effectively a training factor) over the period. Indeed many large developments offer training opportunities for local community members. However, this is often organized on a project by project or piecemeal basis with little regard for the overall strategic plan for the region, employment interests of local residents or long term success.

Many local community members retain strong cultural values and family ties. Small community size means there is a challenge in matching skill levels and training with appropriate jobs in the same spot. This is reflected in Chart 11 which shows that under the working Draft there would always be some unemployed. Furthermore Chart 12 illustrates that more development, for example in the Full Development scenario would not necessarily reduce or eliminate the aboriginal unemployment rate over the period. Often people must choose whether to stay in their home community and be unemployed (or employed in different jobs), or move away to find a job to match their training interests and skills. Providing local jobs and training appropriate to local peoples interests and skills must be a priority if participation rates are to increase.

Chart 11. Deh Cho Employed and Unemployed – Working Draft Over 20 Years

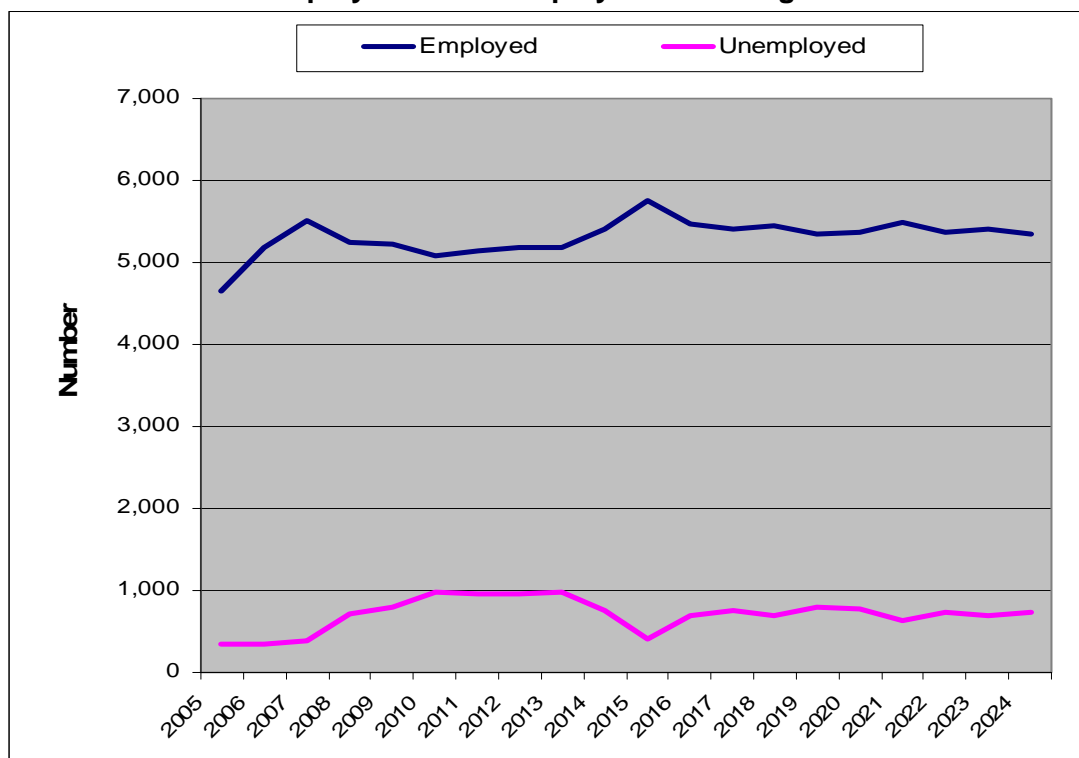
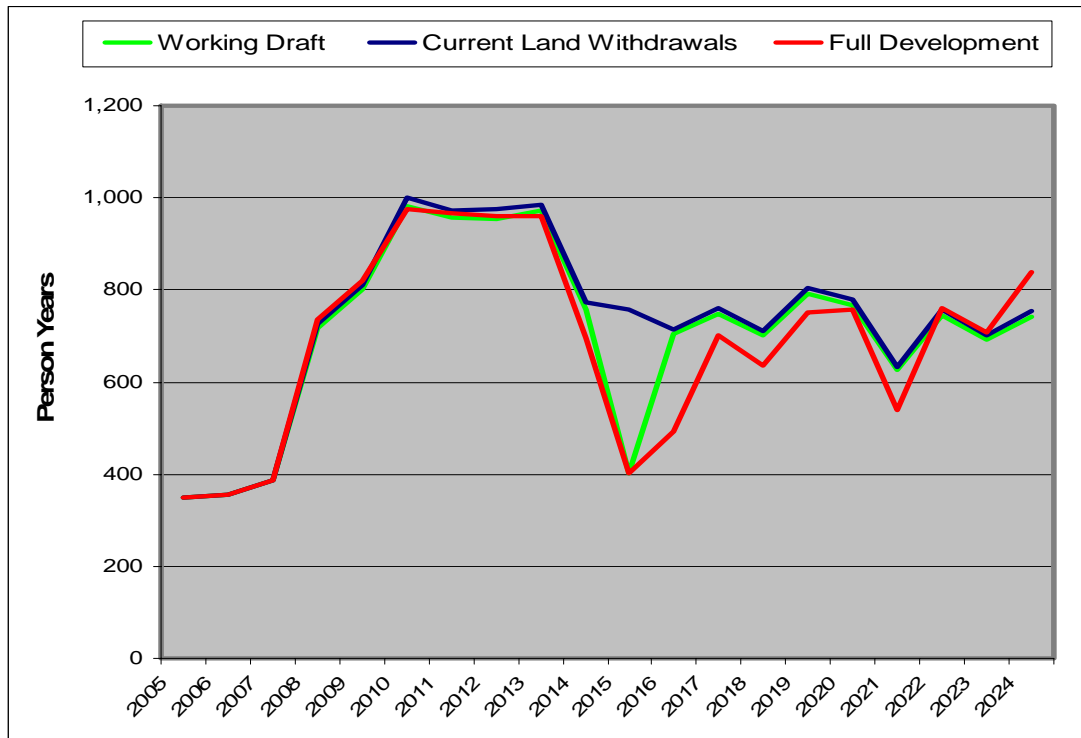


Chart 12. Deh Cho Unemployment - All Scenarios Over 20 Years

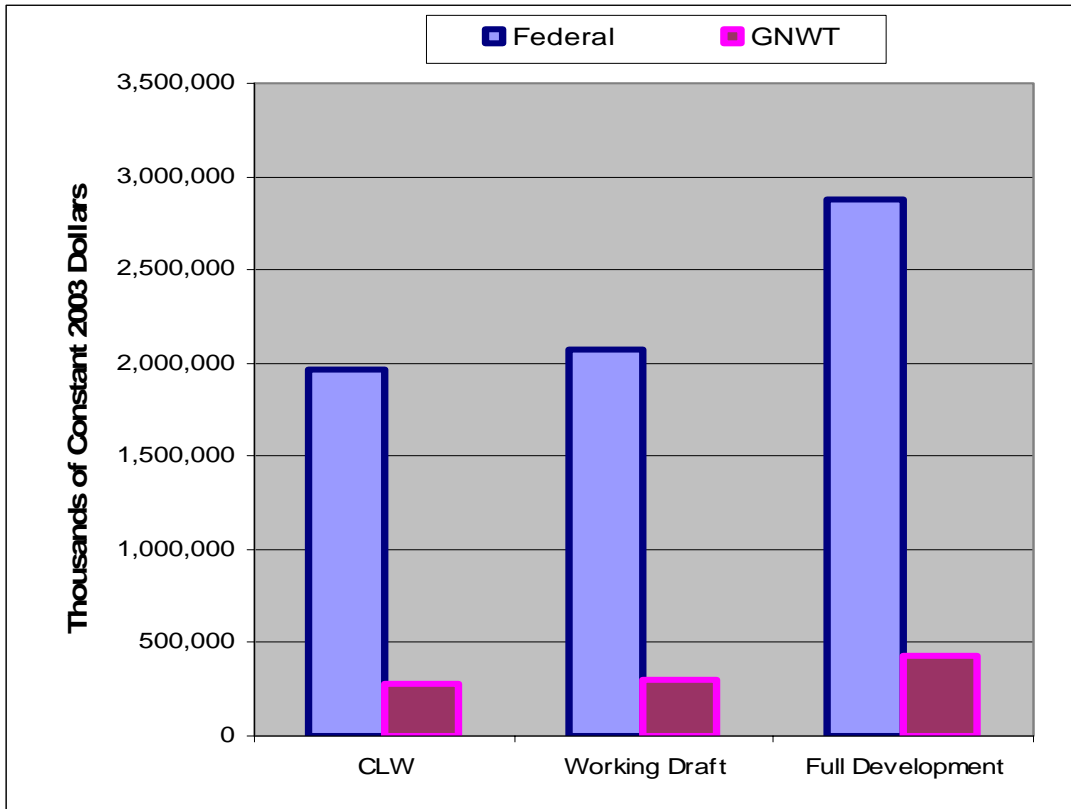


This presents many challenges particularly in developing isolated mineral deposits. In the past mine town sites were developed to accommodate miners and their families. Nowadays, fly-in, fly-out operations are favoured to at least cushion the impact when large projects come and go. However, Chart 11 and 12 indicate that in all scenarios unemployment fluctuates significantly during the period, which is largely related to the size of individual developments in the mining and oil and gas sectors and the relatively short term nature of local participation.

TD Bank Financial Group (2003) suggests a heavy reliance on non-renewable resources is risky and stresses the importance of diversifying into other industries such as Tourism. This is something that communities strongly supported and is reflected in the Working Draft. It will also be important to diversify into secondary industries to build local capacity, add value, increase revenue, local jobs and reduce vulnerability to the price for raw materials. An example of where this is already in practice is in the forestry sector with JMR Log Homes and Patterson Sawmills. The model indicates that without adding value through secondary processing into log homes or squaring off logs to haul south neither operation would be viable.

As mentioned earlier, non-renewable resources will play a major role in driving the economy over the period. Although the Total Gross Domestic Product over 20 years, from the Current Land Withdrawals (\$8.8 Billion) and Working Draft (\$9.1 Billion) are both well below that of the Full Development scenario (\$13.4 Billion) both remain heavily reliant on development in the Mining and Oil & Gas sector. In addition to providing opportunities for development to go ahead, the priority should be to maximize benefits to local communities. Education will be a major priority. As the region moves away from dependence on transfer payments and external funding sources it will be important to ensure a larger portion of total revenue (Chart 13.) remains in the north to support the infrastructure and services upon which sustainable development depends.

Chart 13. Impact on Revenue - Scenarios Over 20 Years



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