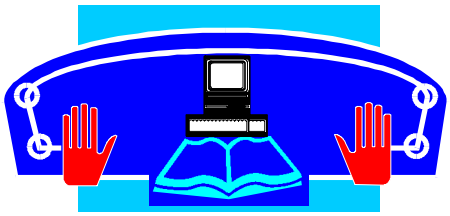


AN ANALYSIS OF THE EFFECTS OF THE CONSTRUCTION OF THE LIARD HIGHWAY ON THE TOURISM INDUSTRY IN THE N.W.T.

Tourism

Analysis/Review

1978

SCOTT M. BRUNSDON

11-55-104

Disk 5

AN ANALYSIS OF THE EFFECTS OF THE CONSTRUCTION OF THE LIARD HIGHWAY ON THE TOURISM INDUSTRY IN THE N.W.T.
Sector: Tourism
11-55-104
Analysis/Review

ENTERED

AN ANALYSIS OF THE EFFECTS OF THE CONSTRUCTION OF THE LIARD HIGHWAY ON THE TOURISM INDUSTRY IN THE N.W.T.

Scott M. Brunsdon

July 1978

A. INTRODUCTION

A computerized simulation model like N.W.T.MOD∅, can be used to define and quantify the impact of changes in exogenous variables. For any impact change at one point in time, all the direct and indirect ramifications in the economy in subsequent time periods will be generated. The complexities of an economic system include numerous feedback loops and inter-relationships that may be overlooked when the analysis is done using intuitive logic. The computerized regional economic development model, however, simulates all of the impacts at a high speed and low cost and it does so within a consistent framework provided the structural relationships present in the economy of the Northwest Territories today do not change dramatically over the years for which the simulation is run.

B. OBJECTIVES OF THE ANALYSIS

This analysis is not an attempt to provide support for or against the government's decision to begin construction of the "Liard Highway." (See Figure A). Nor is it the author's intention to provide a detailed analysis of the tourism benefits which may accrue as a result of the construction of the highway. The only objective of this study is to introduce the regional economic development model to the government of the Northwest Territories and more specifically to the Tourism branch of the Department of Economic Development and Tourism. It is hoped that from this analysis, the tourism branch will see the benefits of the model as a planning tool and use the model to assist policy-makers by its providing of 'forecasts' of economic variables.

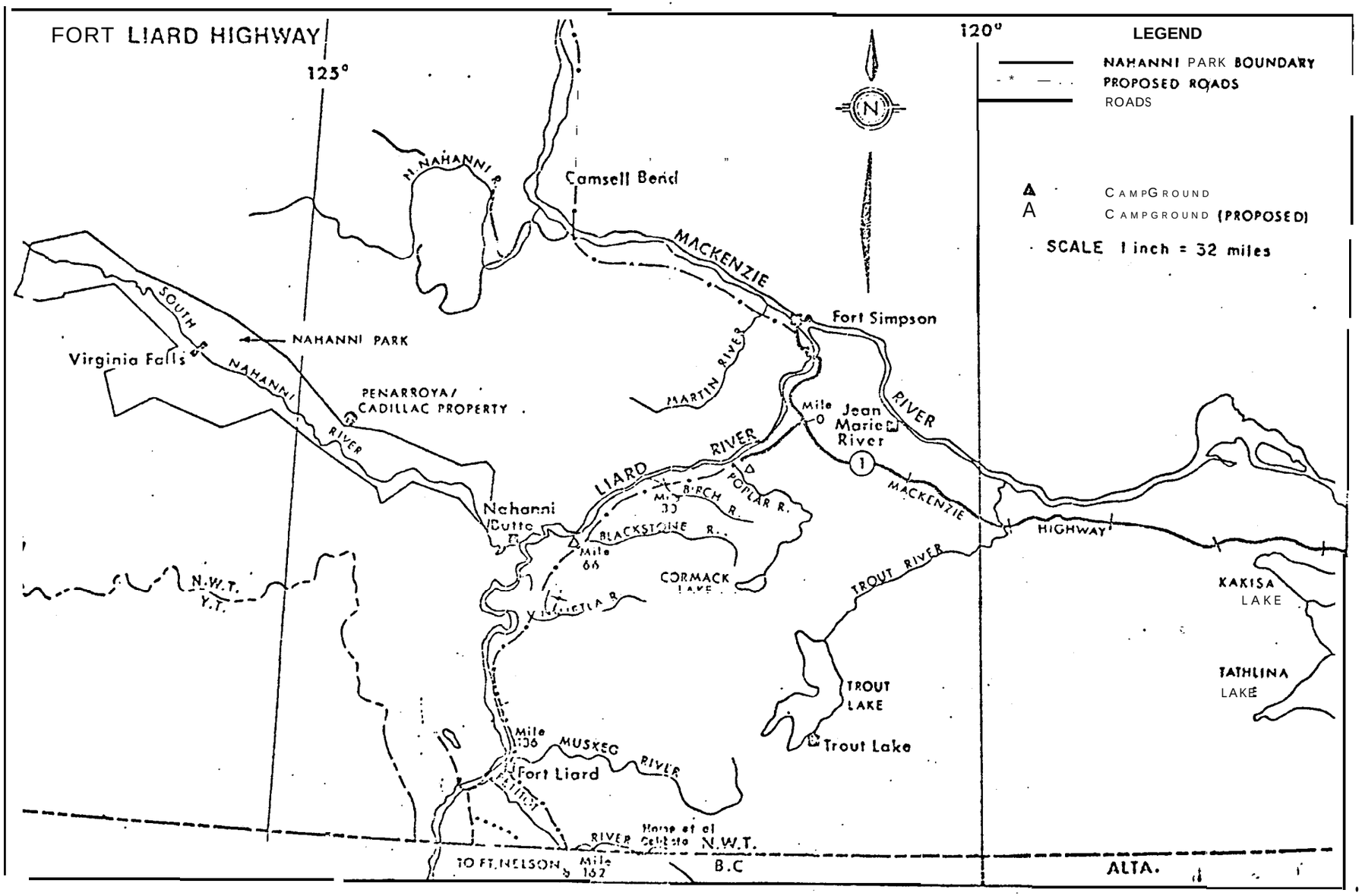
C. METHODOLOGY

The Department of Indian Affairs and Northern Development has included the completion of the Northwest Territories portion of the Liard Highway which would join Fort Simpson to Fort Nelson, British Columbia in its most recent Northern Roads Program. When work goes ahead, it will represent a renewal of activity on the project suspended since 1972. The proposed road will ensure year-round access to Fort Liard, a primarly native community on the Liard River. In addition, the highway could bring substantial potential benefits in Mackenzie Valley resupply, in tourism and in the forest and mining industries.[2]

---

2. For a further explanation on the benefit - cost analysis, see R. W. Stephenson and B. M. Gardner, A Study of the Benefits of the Liard Highway.

Figure A: Liard Highway



This analysis only concerns itself with the potential tourist benefits which could accrue to the Northwest Territories as a result of the completion of the highway. This analysis will not concern itself with any construction benefits, any mining benefits, any resupply benefits or any social welfare benefits which may accrue to the people of the Northwest Territories because of the construction of that highway.

The annual tourist benefits which could occur as a result of the completion of the highway vary from study to study. The author of this analysis is not concerned with the accuracy of these forecasts (if more accurate forecasts of the benefits are available, they can be forwarded to the author and a formal analysis will be done); rather the impact will be taken from a study done by R.W. Stephenson and B.M. Gardner.[3] These authors estimate the maximum expenditures by tourists upon completion of the highway could be $624,000 annually. Considering the recent devaluation of the Canadian dollar and the increasing North American trend to holiday by "getting back to nature", I believe it would not be unrealistic to estimate that the gross value of tourist expenditures could increase by $300,000 once the highway is completed.

To enable a thorough analysis of this impact, it will be assumed the highway will be completed by 1979 and the benefits will begin accruing by then.

The procedure for implementing this impact in the model is:

ADD BELOW LINE 4.26 -

```
IF (I.EQ.29)EXOG (1,10) = EXOG (I,10) + 150000
IF (I.EQ.30)EXOG (I,10) = EXOG (I,10) + 150000
```

D. ANALYSIS OF RESULTS

Given the correct specification of the structure of the model, its usefulness as an analytic tool may be relatively independent of the accuracy of the absolute values of the variables. Calculating the percentage change in the selected economic indicators or calculating the value of some specified multiplier caused by an induced change is a useful tool even if the absolute value happens to be over or understated. In this analysis the impact of a change will be summarized by calculating the income and employment multipliers and by observing the changes that occurred over time in a few selected economic indicators.

---

3. R.W. Stephenson and B. M. Gardner, A Study of the Benefits of the Liard Highway, pp. 19-21.

The income and employment multipliers show the magnitude of the effect on a particular variable relative to the initiated change. Effecting the magnitude of these multipliers are such things as the labour to value--added ratios, the degree of import leakages in that sector, and the in-migration responses. For example, a change in the value of gross exports in the tourism sector results first in a change in the value-added of that sector, the magnitude of which depends on the propensity to import goods and services into the tourism sector. For a given change in the value--added, the labour to value-added ratio determines the level of employment which results. Employment changes, together with the in-migration parameters determine net migration intoor out of the region. Finally, the indirect effects occur as new income is spent and re-spent by the larger population.

1. Income Multipliers .

The increase-in the tourism sector was introduced during the first and second periods of 1979. The income multiplier was calculated as:

$$K_1 = \frac{\text{1985 Experiment GTP - 1985 Benchmark GTP}}{\text{1979 Initiated Change in Gross Tourism Exports}}$$

$$= \frac{\$764,887,552 - \$764,484,096}{\$300,000}$$

$$= \frac{\$403,456}{\$300s000} = 1.345$$

In this example the income multiplier is greater than one, which illustrates that for every one dollar spent by tourists in the Northwest Territories, G.T.P. is increased by approximately $1.30. The reason the income multiplier for the tourism industry is almost 2.5 times greater than the income multiplier for the mining sector is that the propensity to import goods into the tourism sector is much less than the propensity to import goods into the mining sector. This means that a larger portion of goods and services used by the tourism industry comes from local suppliers as compared to the goods and services used by the mining industry.[4]

A second income multiplier which may be of interest is the multiplier associated with a change in local value-added rather than gross expenditures. This multiplier is a measure of the impact of the change in expenditures in the Northwest Territories (net of imports). It was calculated as:

---

4. See Brunsdon, S., An Analysis of the Effect of an Expansion in the Mining Sector of 25% in 1978 and 1979, July 1978.

K_2 = 1985 Experimental GTP - 1985 Benchmark GTP

1979 Experimental Value-Added . 1979 Benchmark Value-Added

= $\frac{\$764,887,552 - \$764,484,096}{\$4,334,561 \quad 4,107,418}$

= $\frac{\$403,456}{\$227,143} = 1.776$

In effect, this multiplier means that for every one dollar paid to local businesses from the tourism industry; G.T.P. increases by $1.80.

2. Employment Multiplier

Aside from the actual expenditures involved, employment multipliers offer a useful measure of the indirect effects of a change in the tourism sector. It is calculated as:

K_3 = 1985 Experimental Total Employment - 1985 Benchmark Total Employment

1979 Change in Tourism Employment

$= \frac{23,948 - 23,928}{174 - 167} = \frac{20}{7} = 2.851$

The significance of this multiplier is that for every one job created in the tourism industry, there will be a total of 2.8 jobs created in the Northwest Territories. This employment multiplier is relatively high compared to employment multipliers in the other sectors because of the tourism industry's low propensity to import goods and services.

3. Job Creation Efficiency

The increase in the gross value of tourism exports (caused by the increase in the number of tourists visiting the Northwest Territories) may also be evaluated in terms of expenditures required per job created. In this example, the cost per job created is lower than' its-equiva" ent value for other sectors because of the low propensity to import goods and services and the slower rate of decline of the labour to value-added rat 0.

COST = Initiated Change in Gross Value of Exports

1985 Change in Total Employment

= $\frac{\$300,000}{20}$ = $15,000 per job created.

Table 1

CHANGE IN GROSS TERRITORIAL PRODUCT

YEAR	BENCHMARK GTP	EXPERIMENT GTP	% CHANGE
1976	368,132,608	368,132,608	-9-
1977	396,660,736	396,660,736	-0-
1978	429,235,968	429,235,968	-0-
1979	465,156,352	465,287,168	0.02
1980	504,416,768	504,673,024	0.05
1981	547,280,640	547,583,488	0.05
1982	594,212,860	594,540,800	0.05
1983	645,838,592	646,190,080	0.05
1984	702,436,864	702,812,160	0.05
1985	764,484,096	764,887,552	0.05

The increased tourism activity that results from the completion of the Liard Highway is not large enough to have a significant effect on the gross territorial product of the Northwest Territories. However, if analyzed on a regional basis, the increased tourism would have a considerable effect on the Fort Simpson-Fort Liard area.

Table 2

CHANGE IN TOTAL EMPLOYMENT (MAN-YEARS)

YEAR	BENCHMARK EMPLOYMENT	EXPERIMENT EMPLOYMENT	% CHANGE (Actual)
1976	13,970	13,970	0 (0)
1977	14,717	14,717	0 (0)
1978	15,592	15,592	- e (o)
1979	16,546	16,554	0.04 (8)
1980	17,568	17,583	0.08 (15)
1981	18,660	18,677	0.09 (17)
1982	19,832	19,850	0.09 (18)
1983	21,101	21,119	0.08 (18)
1984	22,464	22,483	0.08 (19)
1985	23,928	23,948	0.08 (20)

By 1985 the effect of the increased tourism activities increases total employment in the Northwest Territories by 20 man-years of employment. Of that increase, 12 man-years of employment were created in the tourism industry and 8 man-years of employment in the service industries. I believe it is safe to assume that the majority of the job opportunities would be created in the Fort Simpson-Fort Liard area.

When we consider that in 1977, in the four communities in this region (Fort Simpson, Fort Liard, Jean Marie River, and Nahanni Butte) there were only 267 people seasonally or yearly employed;[5] the jobs created by the tourism activity would alleviate some of the unemployment problems.

5. See Figure B from Unemployment in the Mackenzie Valley by the Department of Planning and Program Evaluation, 1978.

Table .3

CHANGE IN UNEMPLOYMENT (MAN-YEARS)

YEAR	BENCHMARK UNEMPLOYMENT	EXPERIMENT UNEMPLOYMENT	% CHANGE
1976	3,239	3,239	0
1977	3,225	3,225	0
1978	3,214	3,214	0
1979	3,202	3,197	-0.15
1980	3,187	3,182	-0.15
1981	3,170	3,165	-0.15
1982	3,127	3,122	-0.15
1983	3,069	3,064	-0.16
1984	3,000	2,994	-0,20
1985	2,918	2,912	-0.20

In 1977, in the Fort Simpson-Fort Liard region, there were 82 people unemployed. An increase of 20 man-years of employment would substantially reduce the high unemployment rates in this area. Thus, the impact of the increased tourism is insignificant when viewed from the aggregate point-of-view but it is very significant at a community level. It is also important to realize that based on 1971 Census data only 1 man-year of employment would be filled from the labour pool outside of the Northwest Territories. The remaining jobs would be filled by residents of the Northwest Territories, most from the communities directly affected.

Figure 8

COMMUNITY	DATA FROM SURVEY: # OF PERSONS EMPLOYED	# OF PERSONS UNEMPLOYED	TOTAL WORK FORCE	UNEMPLOYMENT RATE	ADJUSTED SURVEY DATA: # OF EMPLOYED HUNTERS AND TRAPPERS	ADJUSTED # OF PERSONS UNEMPLOYED	ADJUSTED UNEMPLOYMENT RATE	SURVEY DATA EXTRAPOLATED TO 100%: ESTIMATED # OF PERSONS UNEMPLOYED	ESTIMATED WORK FORCE	ESTIMATE OF ADJUSTED # PERSONS UNEMPLOYED [illegible]
AKLA[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	34.3%	76	265	61
ARCTIC RED RIVER	12	2	14	14.3	[illegible]	7	50.0	9	64	3
F[illegible]	[illegible]	61	110	55.5	[illegible]	64	58.2	93	167	97
F[illegible] GOOD HOPE	70	19	89	21.0	[illegible]	19	21.0	44	206	62
[illegible]	[illegible]	[illegible]	89	9.0	12	20	22.5	70	112	25
FORT P[illegible]	72	57	129	44.2	28	85	65.9	85	193	[illegible]
FORT RESOLUTION	[illegible]	57	169	33.7	[illegible]	57	34.3	65	133	65
[illegible] RIVER	532	193	775	24.9	11	204	26.3	449	1726	454
[illegible]	835	90	[illegible]	9.8	6	96	10.4	144	1477	154
[illegible]	[illegible]	[illegible]	[illegible]	71.[illegible]	[illegible]	61	78.2	79	[illegible]	76
[illegible]	[illegible]	2	39	5.1	21	23	58.9	2	41	24
[illegible]	714	58	772	7.5	0	58	7.5	68	907	68
[illegible]	[illegible]	40	339	41.3	61	201	59.2	196	475	282
S[illegible]	51	3	54	5.6	10	21	38.9	3	59	23
[illegible]	[illegible]	[illegible]	40	5.0	9	11	27.5	5	92	25
[illegible]ARTUK	191	[illegible]	218	12.5	6	34	15.5	32	249	39
[illegible]	9	[illegible]	11	18.2	0	2	18.2	12	64	12
[illegible]	25	[illegible]	28	10.7	1	4	14.3	5	53	8
[illegible]	33[illegible]	26[illegible]	3576	7.9	1	293	7.9	343	4340	345
TOTAL	[illegible]	[illegible]	[illegible]	[illegible]	266	[illegible]	19.0	2208	12052	[illegible]
TOTAL LESS YK	[illegible]	123[illegible]	5760	21.4	263	1496	26.0	1864	8612	2229
TOTAL LESS YK AND HAY RIVER	3247	1023	[illegible]	20.3						

SOURCE T.E R I.S.

Table 4

CHANGE IN TOTAL POPULATION

YEAR	BENCHMARK POPULATION	EXPERIMENT POPULATION	% CHANGE
1976	44,022	44,022	0
1977	45,387	45,387	0
1978	47,071	47,071	0
1979	48,907	48,910	0
1980	50,855	50,874	0.03
1981	52,914	52,937	0.04
1982	55,163	55,189	0.04
1983	57,560	57,587	0.04
1984	60,110	60,138	0.04
1985	62,817	62,847	0.04

The change in population is very small because the vast majority of the jobs created would be filled by the availability of labour in the communities involved and there would be almost no incentive for non-residents to immigrate to the Northwest Territories to fill the job vacancies.

Table 5

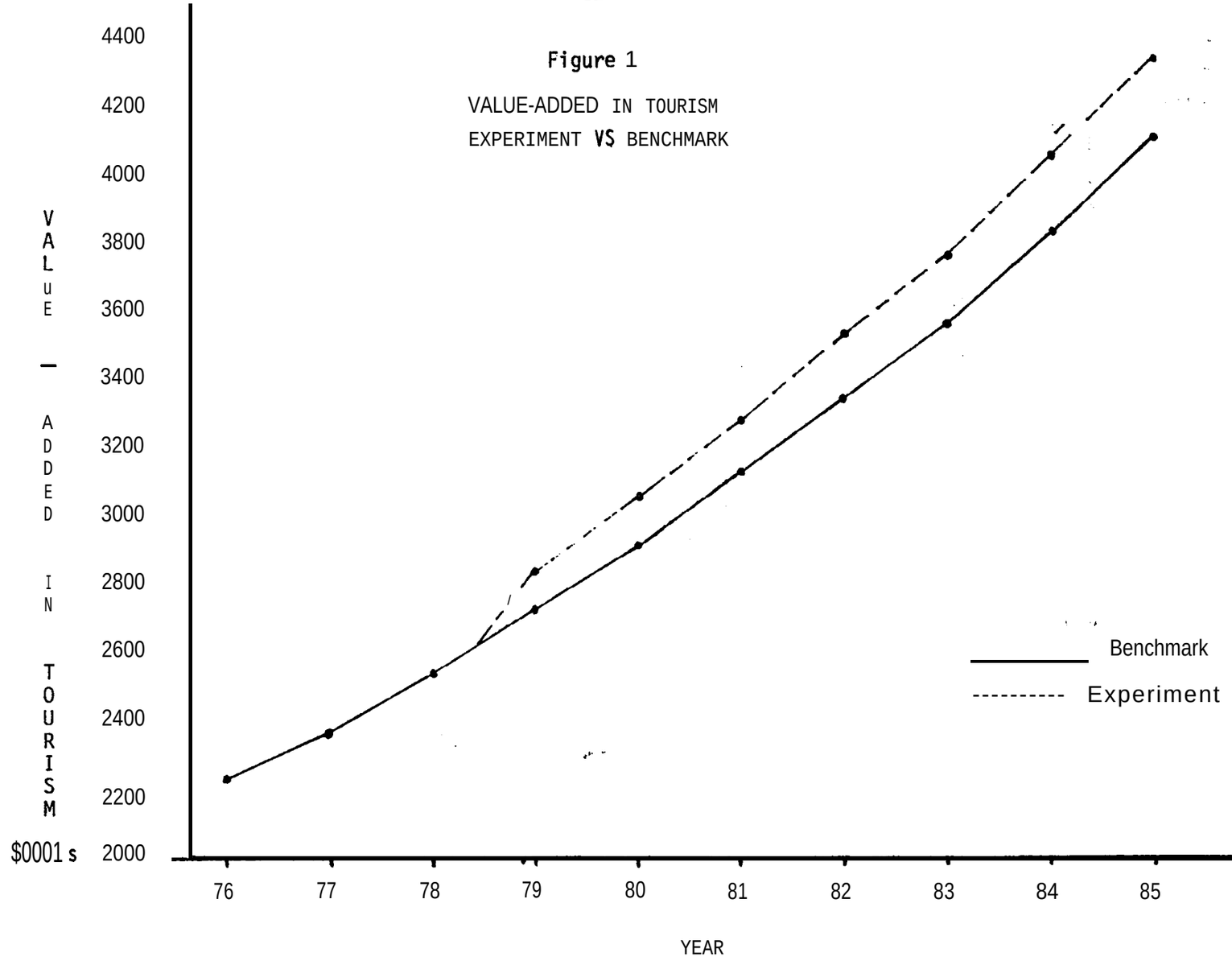
CHANGE IN VALUE-ADDED TOURISM

YEAR	VADX BENCHMARK	VADX EXPERIMENT	% CHANGE
1976	2,223,213	2,223,213	0
1977	2,379,479	2,379,479	0
1978	2,547,058	2,547,058	0
1979	2,726,591	2,840,935	4.19
1980	2,918,911	3,080,318	5.52
1981	3,124,941	3,297,745	5.52
1982	3,345,678	3,530,690	5.52
1983	3,582,208	3,780,303	5.52
1984	3,835,705	4,047,820	5.53
1985	4,107,418	4,334,561	5.53

Value-added in the tourism industry seems to be affected the most by the increase in the gross value of exports in the tourism industry from the construction of the Liard Highway. This is a direct result of the low propensity to import goods and services into the tourism industry.

Figure 1

VALUE-ADDED IN TOURISM
EXPERIMENT VS BENCHMARK



E . 'CONCLUSION

The absolute impact on Gross Territorial Product appears rather small but the entire impact would probably be felt in the Fort Simpson-Fort Liard region. At a local level the impact would be much greater. It is also interesting to note that by the second year after the impact, the short term flucuations (increase in employment etc.) have dampened and the economy seems to be moving along a stable growth path.

BIBLIOGRAPHY

1. Maxwell, G. Brent, Benefit-Cost Analysis of Fort Liard Highway (Ottawa: Economic Staff Group, Northern Economic Development Branch, D. I. A. N. D., 1972).

2. Stephenson, R.W. and Gardner, B.M., A Study of the Benefits of the Liard Highway (Ottawa: Northern Planning Division, D.I.A.N.D., 1976).

3. Sunil, K.A., Benefit-Cost Analysis of Fort Simpson B.C. Boundary Road (Ottawa: Economic Staff Group, Northern Economic Development Branch, D. I. A. N. D., 1970).

4. Unemployment in the Mackenzie Valley, Department of Planning and Program Evaluation, 1978.