Actuarial Report

on the

Benefit Plan financed through the Royal Canadian Mounted Police (Dependants) Pension Fund

As at 31 March 2001

Office of the Superintendent of Financial Institutions
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18 January 2002

The Honourable Paul Martin, P.C., M.P.
Minister of Finance
House of Commons
Ottawa, Canada
K1A 0G5

Dear Minister:

Pursuant to section 56 of the *Royal Canadian Mounted Police Pension Continuation Act*, I am pleased to submit the report on the actuarial review as at 31 March 2001 of the benefit plan established under Part IV of the Act.

Yours sincerely,

Jean-Claude Ménard

Jean-Claude Ménard, F.S.A., F.C.I.A.
Chief Actuary
Public Sector Insurance and Pension Programs

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I. Executive Summary

A. Purpose of this Actuarial Report

This actuarial review of the benefit plan governed by Part IV of the *Royal Canadian Mounted Police Pension Continuation Act* (RCMPPCA) was made as at 31 March 2001 pursuant to section 56 of the Act. The previous review was made as at 31 March 1999. The date of the next periodic review is 31 March 2004 because the valuation cycle has been lengthened to three years, which is permissible under the RCMPPCA.

In accordance with accepted actuarial practice and the RCMPPCA, the main purposes of this actuarial report are:

- to show a reasonable and realistic estimate of the balance sheet (i.e. assets, actuarial liabilities, and actuarial surplus) as at the valuation date, and

- to recommend measures to deal with the actuarial surplus.

B. Scope of the Report

The history of the plan is given in Appendix 1. During the intervaluation period there were no changes to the plan provisions, which are summarized in Appendix 2. However, the Governor in Council made benefit improvements in accordance with the surplus distribution recommendations in the 1999 actuarial report on the plan. The major improvements were effective pension increases of 7.1% as at 1 April 2000 and 5.0% as at 1 April 2001. There were also increases in the lump sum death benefit payable on the death of a member and in the residual amount payable on the early death of a widow.

C. Main Findings

1. As at 31 March 2001 (i.e. the end of the 2001 plan year[1]), the plan had an actuarial surplus of $4.8 million, being the excess of assets of $31.0 million over actuarial liabilities of $26.2 million.

2. Some $1.6 million of actuarial surplus should be used to provide the following benefit improvements:

   - a 2.6% pension increase effective 1 April 2002 for current and prospective widows and children, with further increases of 2.6% and 2.6% effective 1 April 2003 and 1 April 2004, respectively;

   - a 2.5% increase effective 1 April 2002 in the lump sum benefit payable upon the death of a member, with further increases of 2.5% and 2.5% effective 1 April 2003 and 1 April 2004 respectively; and

[1] Any reference to a given *plan year* in this report should be taken as the 12-month period ending 31 March of the given year.

- an increased residual amount payable on the death of a widow of a member who dies in the 2003, 2004, or 2005 plan years, to be obtained by deeming the member's contributions to be increased by 962%, 990%, and 1,018% respectively.

The remaining $3.2 million of actuarial surplus should be retained in the Fund to provide for benefit improvements in each subsequent year in accordance with the established methodology.

D. Future of the Plan

Although the plan membership has been declining steadily since 1948, the Fund itself has grown each year because interest credits have exceeded benefit payments. In Section IV-C it is estimated that this upward trend has come to an end and that the Fund will remain fairly constant for the next few years. Thereafter the Fund will decline steadily until the last dollar is paid to the last widow, estimated to occur in the plan year 2040.

II. Financial Position of the Plan

A. Balance Sheet as at 31 March 2001

The following balance sheet is based on the plan provisions described in Appendix 2, the cumulative dividends in effect as of 1 April 2001 (935% for pension and residual benefits, 509% for lump sums payable on member deaths), and the data and actuarial assumptions described in previous sections.

Assets		
Fund balance		$30,961,000
Actuarial present value of instalments in pay by members		66,000
Total Assets		$31,027,000
Actuarial Liabilities		
Benefits accrued by members		
• widow pensions	$6,958,000	
• lump sums on death without a widow	3,093,000	
• lump sums on withdrawal	9,000	
		10,060,000
Widow pensions in pay		15,018,000
Provision for adverse mortality deviation		666,000
Outstanding payments		465,000
Total Actuarial Liabilities		**$26,209,000**
Actuarial Surplus		**$4,818,000**

B. Disposition of Actuarial Surplus

The established algorithm for the distribution of actuarial surplus, as described in Appendix 3, indicates that $1.6 million should be distributed over the next three years in the form of pension, residual and lump sum death benefit increases. By far the most costly of these increases are with respect to the widow pensions, which would rise by 2.6% on 1 April of each of 2002, 2003, and 2004. Full details of the proposed distribution of actuarial surplus are found in Appendix 9.

C. Sensitivity of Actuarial Liabilities to Variations in Key Assumptions

The supplementary estimates shown below indicate the degree to which the actuarial liabilities of $26,209,000 shown in the balance sheet depend on some key assumptions. The actuarial liability changes shown below can also serve to approximate the effect of other numerical variations in each key assumption, to the extent that such effects are linear.

1. Mortality of Widows

If the mortality rates assumed for widows in each future year were reduced by one-tenth, then the actuarial liabilities would increase by $787,000 (i.e. by 3.0%).

If the assumed improvements in longevity for widows after the 2002 plan year (see Appendix 7) were disregarded, then the actuarial liabilities would decrease by $488,000 (i.e. by 1.9%).

2. Mortality of Members

If the mortality rates assumed for members in each future year were increased by one-tenth, then the actuarial liabilities would increase by $404,000 (i.e. by 1.5%).

If the assumed improvements in longevity for members after the 2002 plan year (see Appendix 7) were disregarded, then the actuarial liabilities would increase by $206,000 (i.e. by 0.8%).

3. Proportion of Married Members

If the proportion of members married at death were increased by one-tenth, then the actuarial liabilities would increase by $253,000 (i.e. by 1.0%).

4. Widow Age Difference

If the age of each future new widow were reduced by one year, then the actuarial liabilities would increase by $213,000 (i.e. by 0.8%).

It should be noted that the investment yield assumption is no longer considered to be a key assumption. Per Appendix 5-D, the Superannuation Accounts from which the Fund's quarterly interest rates are derived have been closed to new money. That being the case, the credited interest rates are highly predictable for at least the next decade and the risk to the plan has decreased accordingly.

III. Reconciliation of Results with Previous Report

This subsection describes the various factors reconciling the actuarial surplus of this valuation with the corresponding items of the previous valuation. Figures in brackets indicate negative amounts. The main items in the table below are explained in the following pages.

Actuarial surplus as at 31 March 1999		**$6,612,000**
Cost of 2000 and 2001 benefit increases		(2,556,000)
Data correction		(11,000)
Restated surplus as at 31 March 1999		4,045,000
Interest on restated surplus		798,000
Provision for adverse mortality deviation		849,000
Experience gains and losses		
Mortality of widows	$(273,000)	
Interest rates	(121,000)	
Mortality of members	115,000	
Proportion married	(66,000)	
Withdrawals	(44,000)	
Age of new widows	(30,000)	
Miscellaneous	50,000	
		(369,000)
Change in actuarial assumptions		
Mortality of widows	$(152,000)	
Interest rates	(137,000)	
Mortality of members	(67,000)	
Withdrawals	(66,000)	
Age of new widows	(57,000)	
Proportion married	(26,000)	
		(505,000)
Actuarial surplus as at 31 March 2001		**$4,818,000**

Explanations of the Foregoing Reconciliation

1. Provision for Adverse Mortality Deviation

In this valuation the provision for adverse mortality deviation is $666,000, which is $849,000 less than the previous provision of $1,266,000 (includes $127,000 on benefit increases) accumulated with interest to 31 March 2001. The provision is sufficient to withstand the mortality loss that would result if all widows survived the plan year immediately following the valuation date (i.e. the 2002 plan year in this case) whereas the previous assumption was based on the least favourable mortality experience in all future years combined. The weakening of the provision recognizes that the government will eventually (perhaps 20 years hence) have to assume the plan's mortality risk if the objective of paying the last dollar to the last widow is to be realized without special treatment for that widow. When the government does so, the provision for adverse mortality deviation will be set to zero.

2. Mortality of Widows

During the two years ended 31 March 2001, the 16 reported widow deaths amounted to 83% of the 19.3 deaths expected in accordance with the assumption in the previous valuation. As a result the plan recorded an experience loss of $273,000.

Both components of the mortality basis for widows, namely the rates assumed for the 2002 plan year and the annual reduction factors applying to those rates in subsequent years, were revised in this valuation. As a result the actuarial surplus decreased by $51,000 and $101,000, respectively, the total being $152,000.

3. Interest Rates

In the previous valuation the Fund was assumed to earn interest at an average annual rate of 9.40% during the two years ended 31 March 2001. The actual interest rates were modestly lower (average 9.22%), causing an experience loss of $121,000.

The interest rates for this valuation were developed by the procedure described in Appendix 5-D. Adopting this revised interest assumption decreased the actuarial surplus by $137,000 in total.

4. Mortality of Members

During the two years ended 31 March 2001, the 19 reported member deaths amounted to 97% of the 19.5 deaths expected in accordance with the assumption in the previous valuation. As a result the plan recorded an experience gain of $115,000.

Both components of the mortality basis for members, namely the rates assumed for the 2002 plan year and the annual reduction factors applying to those rates in subsequent years, were revised in this valuation. As a result the actuarial surplus decreased by $52,000 and $15,000, respectively, the total being $67,000.

5. Proportion Married

In the previous valuation we assumed that the proportion of members leaving a widow eligible for a pension from the Fund would be about one-tenth higher than the corresponding assumption in the 1999 valuation of the RCMPSA pension plan. The 15 new widows during the two-year period ended 31 March 2001 were 1.6 more than expected. As a result the plan recorded an experience loss of $66,000.

For this valuation the proportion married at ages 78 and above was set at 101% or 102% of the previous assumption, depending on the age. This revised assumption decreased the actuarial surplus by $26,000.

6. Withdrawals

In the previous valuation each member was assumed to be subject to a future withdrawal rate of 0.25% per annum. There were no withdrawals during the two-year period ended 31 March 2001, causing an experience loss of $44,000.

For this valuation the withdrawal rate was decreased to 0.15% per annum. This revised assumption caused the actuarial surplus to decrease by $66,000.

7. Age of New Widows

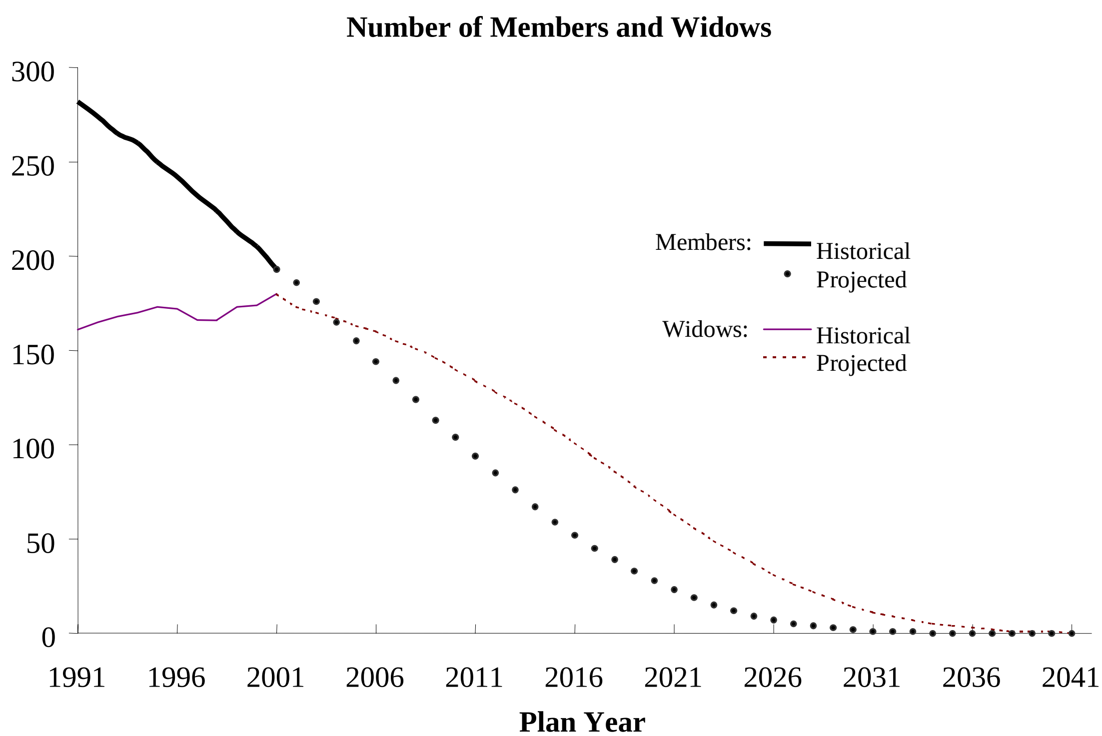
In the previous valuation we assumed that the age of the new widows would be in accordance with the corresponding assumption in the 1999 valuation of the RCMPSA pension plan. The 15 new widows during the two-year period ended 31 March 2001 were on average 0.2 years younger than expected. As a result the plan recorded an experience loss of $30,000.

For this valuation we widened the widow age difference by one year at ages 83 to 87, inclusive. This revised assumption decreased the actuarial surplus by $57,000.

IV. Demographic and Financial Projections

A. Membership Projections

On the basis of the demographic assumptions described in Appendix 7, the member and widow populations were projected over the remaining lifetime of the plan. The results are shown in the following graph.



Over the last decade the number of members has fallen steadily so that only 186 remain at 1 April 2001; this trend is projected to continue until the death of the last member, which is expected in the plan year 2033.

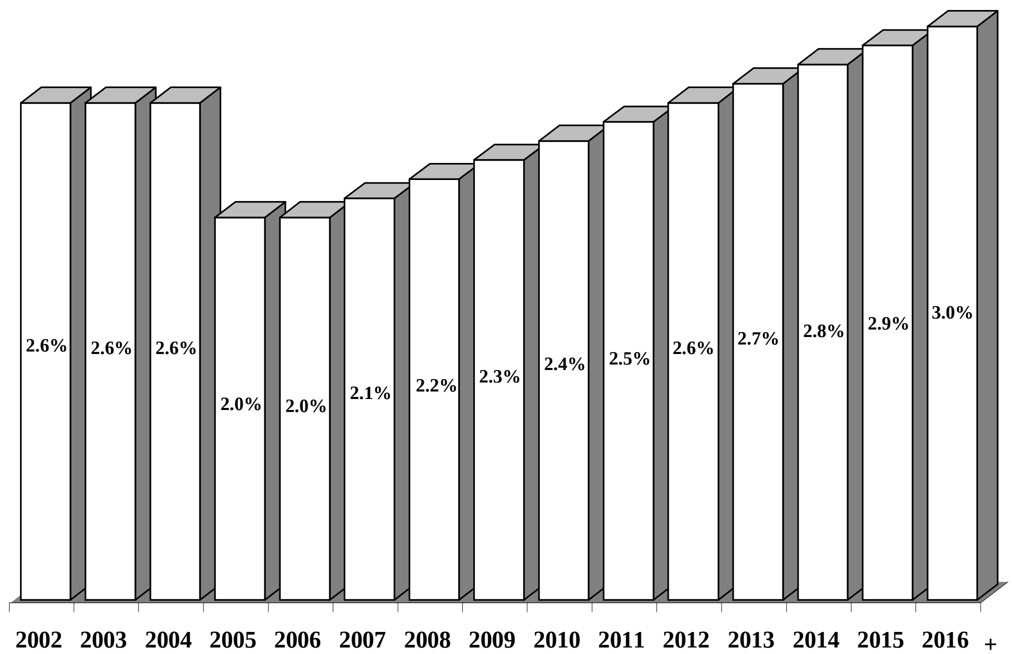
The number of widows has fluctuated around an upward trendline over the last decade, reaching its maximum of 173 at 1 April 2001. A steady decline is expected thereafter, with the last widow expected to survive to the plan year 2040.

Emerging mortality experience will be subject to random fluctuations. Consequently the actual membership statistics will deviate, perhaps materially due to the relatively small number of participants, from those shown in the graph.

B. Benefit Improvement Projections

Using the assumptions described in Appendix 6 and the recommended distribution of actuarial surplus in Appendix 9, the yearly increases in the amount of a widow pension were projected as shown in the following bar chart.

Projected Benefit Increases at 1 April

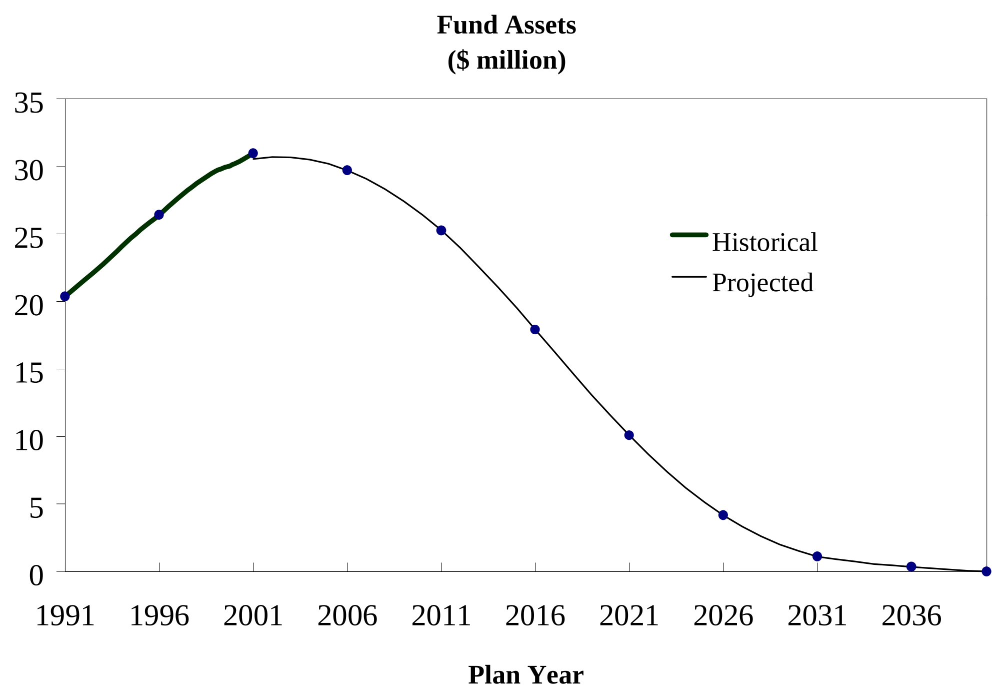


The projected 2.6% annual increases in the first three years would raise the purchasing power of widow pensions marginally, given that the rate of inflation is expected to average 2.3% per annum during that period. The projected annual increases from 1 April 2005 onward would match the expected rate of inflation, thereby maintaining the purchasing power of the widow pensions at the 1 April 2004 level.

The lump sum benefit payable upon the death of a member was projected to increase at 2.5% per annum, which is roughly the expected average rate of inflation over the remaining lifetime of the plan.

C. Asset Projections

Using the assumptions described in Appendices 6 and 7 and the foregoing benefit improvement projections, the Fund assets were projected as shown in the following graph. It should be noted that the outstanding payments of $465,000 shown on the balance sheet were assumed to be made on 1 April 2001.



Under this projection the Fund assets reach their maximum of $30,961,000 on 31 March 2001, remain fairly constant for the next few years, and then decline steadily thereafter until the Fund is exhausted in the plan year 2040.

The actual progress of the Fund assets will be subject to several influences, most notably the random mortality fluctuations affecting the membership projections.

V. Actuarial Opinion

In our opinion, for the purposes of this report:

- the data upon which the calculations were based are sufficient and reliable;
- the assumptions used are, in aggregate, appropriate; and
- the valuation methodology employed is appropriate.

This report has been prepared, and our opinions given, in accordance with accepted actuarial practice, and particularly with the Recommendations of the Canadian Institute of Actuaries for Actuarial Advice given with respect to Self-Insured Employee Benefit Plans**.**

L.M. Cornelis
Senior Actuary
Office of the Chief Actuary
Fellow of the Canadian Institute of Actuaries
Fellow of the Society of Actuaries

Jean-Claude Ménard
Chief Actuary
Office of the Chief Actuary
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Peer Review

I have reviewed this report, and believe that the actuarial assumptions are appropriate for the purposes of the valuation and the methods used are appropriate for the purposes of the valuation. In my opinion, the report has been prepared, and the actuaries' opinions given, in accordance with accepted actuarial practice.

Elliot Trottier
Senior Actuary
Office of the Chief Actuary
Fellow of the Canadian Institute of Actuaries
Fellow of the Society of Actuaries

Ottawa, Canada
18 January 2002

Appendix 1 - History of the Plan

The benefit plan associated with the Royal Canadian Mounted Police (Dependants) Pension Fund was established in 1934 when Part IV was added to the *Royal Canadian Mounted Police Act* (RCMP Act). Plan membership was optional for constables on active duty on 1 October 1934; however, it was mandatory for constables appointed to the Force thereafter.

In 1948 Part V (a new pension arrangement) was added to the RCMP Act. Plan members who elected to become contributors under Part V were required to either suspend or terminate their participation in the plan. Moreover, the plan was then closed to any new entrants except certain constables whose continuous service dated back to 1 October 1934 or earlier. Lastly the plan was amended so that the government assumed responsibility for any deficit in the Fund.

In 1959 the *Royal Canadian Mounted Police Superannuation Act* and the *Royal Canadian Mounted Police Pension Continuation Act* (RCMPPCA) were enacted to provide for all RCMP pension arrangements. The plan was transferred to the RCMPPCA, where it remains.

In 1975 the age at which the eligibility of a son for survivor benefits expires was raised from 18 years to 21 years, which already applied to a daughter. In addition survivor benefits were extended to age 25 for unmarried sons and daughters still in school, subject to certain conditions. Lastly the 4% annual interest rate that had always been applied to the Fund balance was replaced by the rate applied to the three major Superannuation Accounts (Public Service, Canadian Forces, and Royal Canadian Mounted Police), which is derived from the yield on a notional long-term bond portfolio (see Appendix 2). The resulting higher interest credits have flowed through to members and survivors in the form of more generous benefit increases from 1975 onward.

In 1989 marital status was eliminated in determining the eligibility for survivor benefits of a son or daughter between ages 21 and 25. Also eliminated was the provision for reducing the pension of a widow more than 20 years younger than her husband at the date of his death.

In 1993 the plan was amended to allow the payment of pension to a widow cohabiting with a man to whom she is not married.

Appendix 2 - Summary of Plan Provisions

The current provisions of the benefit plan governed by Part IV of the RCMPPCA are summarized in this Appendix. However, the Act shall prevail if there is a discrepancy between it and the summary.

A. Membership

As mentioned in Appendix 1, plan membership was compulsory for constables appointed to the Force from 1934 to 1948. Thereafter the plan was essentially closed to new entrants. The last plan member retired from active duty in 1978.

B. Assets

The plan is financed through the Royal Canadian Mounted Police (Dependants) Pension Fund, which forms part of the Public Accounts of Canada. The Fund is credited with all instalment payments made by the members, and charged with all benefit payments when they become due. The Fund is also credited with investment earnings as though net cash flows were invested quarterly in 20-year Government of Canada bonds issued at prescribed interest rates and held to maturity. No formal debt instrument is issued to the Fund by the government in recognition of the amounts therein.

C. Contributions

1. Member Contributions

(a) Current Service

To purchase current service benefits, a member on active duty contributed 5% of pay together with any supplementary amounts in accordance with the scale set out in the RCMPPCA.

(b) Past Service

A member on active duty could elect to contribute, either in a lump sum or by equivalent[1] instalments, to purchase benefits in respect of any period of eligible past service, based on his rate of pay at the date of election. Similarly, on promotion to or within the ranks of non-commissioned officers, he could elect to partially or fully upgrade the accrued benefits.

2. Government Contributions

The RCMPPCA requires the Government of Canada to make contributions only if the Fund becomes insolvent. Every valuation to date has revealed a surplus and therefore the government has never contributed directly to the Fund.

[1] Based on the mortality rates of the CM(5) Table with interest at 4% per annum.

D. Investment Earnings

1. Interest Rate on New Money

The prescribed interest rate on the newly issued notional bonds (see Section B above) is the average rate on outstanding Government of Canada bonds with 20 or more years to maturity.

2. Allocation of Investment Earnings

Investment earnings are credited every three months to the Fund on the basis of the yield in the preceding quarter on the notional bond portfolio underlying the combined Superannuation Accounts of the Public Service, Canadian Forces, and Royal Canadian Mounted Police pension plans.

E. Basic Death Benefits

The amount of basic benefit is determined solely in accordance with the terms of the RCMPPCA, without reference to any cumulative dividend (see next subsection) that may be payable. The following lump sum and pension benefits, as applicable, are payable on the death of a member who has made the scheduled contributions and left them in the Fund. In light of the advanced ages of the current members, any survivor benefits payable to a child or eligible student are ignored.

1. Widow Pensions

A widow is entitled to the pension purchased by the member's contributions at the rates specified in Table II of the Schedule to the RCMPPCA. In many cases the pension is approximately equal to 1.5% of the member's final pay multiplied by his years of credited service. The pension is payable for life. If a widow dies before receiving payments at least equal to the member's contributions, then a residual amount is payable.

2. Lump Sum Benefits

If a member is not survived by a widow, a lump sum payment is made to the dependants and relatives of the member who are, in the opinion of the relevant Minister, best entitled to share the benefit. The lump sum amount is equal to the present value[1] of a pension to a hypothetical widow 20 years older than the member at his death, but not exceeding 75 years of age.

3. Benefit Limitation

The basic pension payable to the widow of a member who married after age 60 is reduced to ensure that the present value[1] of her pension does not exceed the lump sum otherwise payable on his death.

[1] Based on the mortality rates of the a(f) Ultimate Table with interest at 4% per annum.

F. Cumulative Dividends on Basic Death Benefits

If the Fund is substantially in excess of the amount required to make adequate provision for the prospective payments to be made out of it, the Governor in Council may by order increase all the plan benefits, or any of them, in such manner as may appear equitable and expedient.

Until 31 March 1991 the benefit increases took the form of cumulative dividend percentages applied equally to all basic death benefits except the residual amount payable on the early death of a widow. Effective 1 April 1991 separate cumulative dividend percentages for lump sum benefits and for pensions to widows were introduced. At the same time, cumulative dividends first became applicable to the residual amount payable on the early death of a widow.

The cumulative dividends that may be declared are not subject to the limitations on the basic death benefits described in subsection B-3 above.

G. Withdrawal Benefits

A member can elect at any time to withdraw his contributions from the Fund, without interest; neither he nor any of his dependants has any entitlement under the plan thereafter.

H. Instalment Payments

A member can elect at any time to discontinue instalment payments being made in respect of a past service election. The present value[1] of the discontinued payments is thereupon converted into an equivalent[2] amount of basic death benefit and his accrued basic death benefit is reduced accordingly. In turn, this causes a reduction in the amount of the cumulative dividend.

If a member dies while making instalment payments, his entitlement under the plan remains unchanged because all required payments are deemed to have been made.

[1] Based on the mortality rates of the CM(5) Table with interest at 4% per annum.

[2] Based on the rates in Table II of the RCMPPCA.

Appendix 3 – Plan Assets

A. RCMP (Dependants) Pension Fund

The plan is entirely financed through the RCMP (Dependants) Pension Fund, which forms part of the Public Accounts of Canada. The Fund is:

- credited with all contributions made by members;
- charged with the benefit payments made; and,
- credited with investment earnings as though net cash flows were invested quarterly in 20-year Government of Canada bonds issued at prescribed interest rates and held to maturity. No formal debt instrument is issued to the Account by the Government in recognition of the amounts therein. Investment earnings are credited every three months to the Account on the basis of the actual average yield for the same period on the combined Superannuation Accounts of the Public Service, Canadian Forces and RCMP pension plans.

B. Reconciliation of Balances in the Fund

		(thousands of dollars)	
Fund Balance as at 31 March 1999			29,691
Plan year	**2000**	**2001**	**2000-2001**
Public Accounts opening balance	29,691	30,381	29,691
Income			
Instalment payments	13	12	25
Investment earnings	2,689	2,657	5,346
Subtotal	2,702	2,669	5,371
Expenditures			
Survivor pension benefits	1,927	2,089	4,016
Widow death benefits	85	0	85
Subtotal	2,012	2,089	4,101
Public Accounts closing balance	30,381	30,961	30,961
Fund balance as at 31 March 2001		30,961	30,961

The foregoing table shows the reconciliation of the Fund from the previous valuation date to the current valuation date. During that period, the Account balance grew by $1,270,000 (i.e. a 4.3% increase) to reach $30,961,000 as at 31 March 2001.

C. Rates of Return

The following rates of return on the Fund in each of the last two plan years were calculated, using the foregoing entries, on the assumption that all transactions other than investment earnings occurred at the midpoint of the plan year:

2000	2001
9.37%	9.06%

D. Source of Data

The Fund entries shown in Section B above were taken from the financial statements prepared in respect of the plan by the Office of the Auditor General.

Appendix 4 – Membership Data

A. Source of Membership Data

The individual data in respect of members and widows were provided as at 31 March 2001, and are shown in the summaries of data in this Appendix. All data were supplied by the RCMP Services Section of Public Works and Government Services Canada.

B. Validation of Membership Data

The principal validation applied to the raw valuation data were as follows:

- reconciling the data with the data used in the previous valuation report (see Table 4A), and
- comparing the amounts of benefit actually paid since the last valuation, as given in the Public Accounts, with the amounts as estimated from the valuation data.

Based on the omissions and discrepancies identified by these and other tests, appropriate adjustments were made to the basic data after consulting with the data providers.

It was concluded that the valuation data used in this report were accurate.

Table 4A

Reconciliation of Membership

In this report, *member* means a former contributor whose contributions remain in the Fund and *widow* means a widow whose pension is payable from the Fund.

There were no female constables when the Fund was open to new entrants; it follows that all current members are males and that all surviving spouses are widows.

The following table derived from the basic data reconciles the numbers of members and widows as at 31 March 2001 with the numbers shown in the previous report. There is no child annuity in course of payment as at 31 March 2001.

	Members	Widows
At 31 March 1999	205	174
Deaths	(19)	(16)
New survivors	-	15
At 31 March 2001	186	173

Table 4B

Members as at 31 March 2001

Age Last Birthday	Number	Annual Pension Payments[1] Average	Total
70-74	52	$18,800	$979,000
75-79	54	18,300	990,000
80-84	53	14,400	763,000
85-89	21	12,800	269,000
90-94	6	11,200	67,000
All ages	186[2]	$16,495	$3,068,000

Average age last birthday: 78.7 years

[1] Amounts reflect the basic pension together with the 935% cumulative dividend effective from 1 April 2001.

[2] Of these members, 60 were making instalment payments for life in respect of past service elections. The aggregate annual amount was $11,126 (average was $185).

Table 4C

Widows as at 31 March 2001

Age Last Birthday	Number	Annual Pension Payments[1] Average	Total
60-64	3	$15,700	$47,000
65-69	11	16,400	180,000
70-74	27	17,100	462,000
75-79	48	12,900	617,000
80-84	36	12,600	453,000
85-89	32	9,500	305,000
90-94[2]	16	8,600	138,000
All ages	173	$12,728	$2,202,000

Average age last birthday: 79.8 years

[1] Amounts reflect the basic pension together with the 935% cumulative dividend effective from 1 April 2001 for widows.

[2] Includes one widow age 100.

Appendix 5 – Methodology

A. Assets

The principal asset of the plan consists of the recorded balance in the Royal Canadian Mounted Police (Dependants) Pension Fund, which forms part of the Public Accounts of Canada. This balance is equal to the book value of the portfolio of long-term bonds considered to be held by the Fund, as described in Appendix 3. For consistency, the actuarial liabilities are discounted at assumed interest rates, described in Section D, that fully reflect the earning power of the assets.

The only other asset consists of the value, discounted in accordance with the projected Fund yields described in Section D below and shown in Appendix 6, of all future instalment payments by members in respect of past service elections made by 31 March 1978, which is when the last plan member retired from active duty.

B. Actuarial Liabilities

1. Members

The actuarial liabilities in respect of the members as at the valuation date correspond to the value, discounted in accordance with the projected Fund yields described in section D below and shown in Appendix 6, of all future benefits accrued as at that date in respect of service as an active member of the Force. The cumulative dividend was assumed to be fixed at 935% for pensions and at 509% for lump sums payable on member deaths.

2. Widows

Consistent with accepted actuarial practice and standards, the actuarial liabilities in respect of the widows as at the valuation date correspond to the value, discounted in accordance with the projected Fund yields described in section D below and shown in Appendix 6, of all future benefits to which those widows are entitled. The cumulative dividend was assumed to be fixed at 935%.

C. Margins Against Adverse Fluctuations

1. Provision for Adverse Mortality Deviation

A best-estimate mortality assumption is useful in projecting the mortality experience of a sufficiently large group of insureds or pensioners. As the group size diminishes, random fluctuations play a larger role in mortality experience. Therefore the best-estimate mortality assumption used in this valuation is not necessarily a good indicator of the future mortality experience of the relatively small number of members and widows remaining in the plan.

As in the previous valuation report, an additional actuarial liability has been set up to absorb the financial impact of random adverse mortality deviations. The amount of this provision was set equal to the loss that would be suffered if there were no deaths in the widow population in the plan year following the valuation date. When the surplus is exhausted (perhaps 20 years hence), the plan will be able to cover no more than one year of adverse mortality experience. At such time the solvency of the plan can only be assured by the government assuming the mortality risk, which would allow the provision to be released into surplus.

2. Other Margins

While adverse mortality deviations are the principal risk to the solvency of the plan, there are also less important risks such as adverse deviations in the proportion-married and widow age experience. These risks can be dealt with by curtailing the future annual benefit increases generated by the surplus, if need be. The probability of any future benefit decrease is therefore considered remote.

D. Projected Yields on the Fund

The government applies the same quarterly interest rates to the Fund as it does to the three major Superannuation Accounts (Public Service, Canadian Forces, and Royal Canadian Mounted Police), which were effectively closed to new money from 1 April 2000 onward. The projected yields (shown in Appendix 6) assumed in computing the present value of benefits involved in estimating the liabilities are the projected annual yields on the combined book value of the three accounts, all increased by 0.09% per annum. The increase recognizes that the practice of applying the quarterly interest rate to the beginning principal rather than the average principal during the quarter is advantageous to the Fund because its net cash outflows are proportionately much greater than those of the three accounts. In the previous reports, the extra yield on the Fund was assumed to be 0.08% per annum.

The projected yields were determined by an iterative process involving the actual investment earnings on the combined assets of the three accounts as at the valuation date, the assumed future new money interest rates (also shown in Appendix 6), and the assumed future combined cash flows for the three accounts. This approach is in accordance with the plan provision, common to the three pension plans, stipulating that the average yield on the combined accounts is to be used in allocating aggregate investment earnings to each of the three accounts.

Appendix 6 – Economic Assumptions

A. Level of Inflation

The level of future inflation plays no role in the valuation itself. However, it is of great importance in the recommended disposition of the actuarial surplus because enough surplus ought be retained at all times so that future benefit increases (i.e. those based on subsequent valuations) are at least equal to future inflation rates. The assumed inflation rates are shown in the table below.

B. Interest Assumptions

The economic assumptions for this valuation are summarized in the table below. They are taken from the actuarial reports as at 31 March 2001 on the pension plans for the federally appointed judges and the Members of Parliament, except that the projected yield has been increased by 0.09% per annum, per Appendix 5-D.

		Interest Rates	
Plan Year	Inflation Rate	New Money	Fund Yield
2002	2.9%	5.0%	8.81%
2003	2.0	5.0	8.52
2004	2.0	5.0	8.32
2005	2.0	5.0	8.06
2006	2.0	5.0	7.80
2007	2.1	5.1	7.58
2008	2.2	5.2	7.39
2009	2.3	5.3	7.18
2010	2.4	5.4	6.98
2011	2.5	5.5	6.78
2012	2.6	5.6	6.41
2013	2.7	5.7	6.23
2014	2.8	5.8	6.11
2015	2.9	5.9	5.98
2016	3.0	6.0	5.83
2017	3.0	6.0	5.72
2018	3.0	6.0	5.65
2019	3.0	6.0	5.65
2020	3.0	6.0	5.67
2025	3.0	6.0	5.78
2030	3.0	6.0	5.98
2035+	3.0	6.0	6.09

Appendix 7 – Demographic Assumptions

Except where otherwise noted, all demographic assumptions were determined from the plan's own experience. The assumptions made in the previous valuation were updated to reflect the experience of April 1997 to March 2001.

A. New Entrants

Because the Fund has been closed to new entrants since 1959, the assumption that there would be no future new entrants was retained from the previous valuation.

B. Members

Table 7A shows the assumed rates of mortality applicable to members in the 2002 plan year; at ages 85 to 100, the rates are 2% higher than those assumed for that plan year in the previous valuation. The mortality rates for subsequent plan years were obtained by applying the accompanying annual reduction factors (generally somewhat lower than the factors in the previous valuation) to the 2002 mortality rates.

Each member was assumed to be subject to a withdrawal rate of 0.15% per annum, per Table 7B; the corresponding rate in the previous valuation was 0.25%.

C. Widows

Table 7C shows the rates of mortality assumed applicable to widows in the 2002 plan year; at most ages, the rates are 1% lower than those assumed for that plan year in the previous valuation. The mortality rates for subsequent plan years were obtained by applying the accompanying annual reduction factors (generally somewhat higher than the factors in the previous valuation) to the 2002 mortality rates.

D. Prospective Widows

Table 7D shows the proportion of members assumed to leave, upon death, a widow eligible for a pension from the Fund; at ages 78 and over the proportions are marginally higher (i.e. by 1% or 2%, depending on the specific age) than those assumed in the previous valuation. Also shown is the assumed age difference between spouses, which is as assumed in the previous valuation except that it has been widened by one year at ages 83 to 87, inclusive.

E. Eligible Children

The assumption that no member would be survived by a child or student eligible to receive an annuity was retained from the previous valuation.

Table 7A

Assumed Mortality of Members

(per 1,000 members)

Age Last Birthday	Current[1] Annual Rates	Future[1] Annual Rate Reductions[2]	
		2003	2028+
65	12.9	2.00%	.50%
70	19.9	2.00	.50
75	30.6	1.75	.50
80	56.3	1.25	.50
85	89.3	1.00	.50
90	136.8	.75	.50
95	230.0	.50	.50
100	314.3	.25	.50
105	415.2	-	-
110	495.7	-	-
115	500.0	-	-

[1] *Current* means the 2002 plan year and *future* means the plan years thereafter.

[2] Mortality reduction is based on a 25-year select period during which the annual mortality reductions are found by linear interpolation between the figures for 2003 and 2028.

Table 7B

Assumed Withdrawal of Members

(per 1,000 members)

Annual rate at all ages: 1.5

Table 7C

Assumed Mortality of Widows

(per 1,000 widows)

Age Last Birthday	Current[1] Annual Rates	Future[1] Annual Rate Reductions[2] 2003	2028+
60	6.2	1.00%	.50%
65	9.8	1.25	.50
70	16.0	1.50	.50
75	27.4	1.25	.50
80	45.4	1.25	.50
85	74.9	1.00	.50
90	127.6	.75	.50
95	214.8	.50	.50
100	303.5	.25	.50
105	401.9	-	-
110	485.5	-	-
115	500.0	-	-

[1] *Current* means the 2002 plan year and *future* means the plan years thereafter.

[2] Mortality reduction is based on a 25-year select period during which the annual mortality reductions are found by linear interpolation between the figures for 2003 and 2028.

Table 7D

Assumptions for Prospective Widows

Age Last of Member at Death	Proportion of Married Members	Widow Age Difference[1]
70	.91	(3)
75	.84	(3)
80	.77	(4)
85	.66	(5)
90	.49	(5)
95	.31	(6)
100	.16	(8)
105	.07	(11)
110	.03	(14)
115	.01	(18)

[1] Age of widow less age of member both calculated at death of member.

Appendix 8 – Other Assumptions

A. Late Reporting of Deaths

The data reflect only those member and widow deaths up to 31 March 2001 that were reported by 15 April 2001. Any member death reported subsequently would cause a loss that was assumed to be offset by a gain on a late-reported widow death. The reporting lag was therefore ignored when determining the actuarial liability.

B. Administrative Expenses

For this valuation, the expenses incurred for the administration of the plan were ignored. These expenses, which are not charged against the Fund, are borne entirely by the government and are commingled with all other government expenses.

Appendix 9 - Recommended Disposition of Actuarial Surplus

The $4,818,000 actuarial surplus estimated for this report is large relative to the actuarial liabilities of $26,209,000. However, virtually no actuarial surplus is expected to arise from future experience. Therefore the current actuarial surplus, together with whatever portion of the current provision for adverse mortality deviation that may eventually prove to be redundant, effectively must provide for all benefit increases until the Fund is exhausted in the plan year 2040 or thereabouts.

The recommended benefit increases herein are intended to distribute actuarial surplus as it is earned, based on the following procedure.

- Firstly, distribute the very small amount of actuarial surplus necessary to ensure that the residual benefit payable on the death of a new widow will on average be equal to the lump sum death benefit otherwise payable on the death of her husband.

- Secondly, retain sufficient actuarial surplus in the Fund so that the purchasing power of benefits is at least maintained after the 2005 plan year (i.e. the last year for which a benefit improvement is recommended herein) if the future experience is in accordance with the economic and demographic assumptions made in this report.

- Thirdly, apply any remaining actuarial surplus to increase the benefits payable in the 2003, 2004, and 2005 plan years.

Based on the foregoing procedure, the amount of actuarial surplus recommended for distribution in the 2003, 2004, and 2005 plan years is $1,637,000, which could provide the recommended benefit improvements shown on the next page. The remaining $3,181,000 of actuarial surplus should be retained in the Fund for future distribution in accordance with the established methodology.

Recommended Benefit Improvements

1. **Increase the pension for current and prospective widows and children** in accordance with the following table:

Effective Date	Dividend Increase[1]	Cumulative dividend[1]	Effective increase[2]
1 April 2002	27%	962%	2.6%
1 April 2003	28%	990%	2.6%
1 April 2004	28%	1,018%	2.6%

2. **Increase the lump sum benefit payable upon the death of a member,** in accordance with the following table:

Effective Date	Dividend increase[1]	Cumulative dividend[1]	Effective increase[2]
1 April 2002	15%	524%	2.5%
1 April 2003	16%	540%	2.5%
1 April 2004	16%	556%	2.5%

3. **Increase the residual amount payable on the subsequent death of a widow of a member who dies in the 2003, 2004, or 2005 plan years**, by deeming the member's contributions to be increased by 962%, 990%, and 1,018% respectively.

[1] Expressed in terms of the pensions purchased by contributions.

[2] Percentage increase to the total pension (i.e. the pension purchased by contributions, together with the cumulative dividend applied thereto) in payment immediately before the relevant effective date.

Appendix 10 – Acknowledgements

The Office of the Auditor General provided the financial statements upon which the income statement and Fund balance were based.

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The following individuals assisted in the preparation of this report:

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