NOVA SCOTIA RISK SHARING POOL

JANUARY 2020 OPERATIONAL REPORT

ACTUARIAL HIGHLIGHTS

Related Bulletin: F2020-015 Nova Scotia Risk Sharing Pool – January 2020 Operational Report

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FACILITY Association

ACTUARIAL HIGHLIGHTS

RSP NOVA SCOTIA

OPERATIONAL REPORT

JANUARY 2020

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1 Summary

Key Points

(a) At its Feb. 18, 2020 meeting, the FA Board appointed Mr. Cosimo Pantaleo of Ernst & Young LLP (EY) for fiscal year-end 2019. Recall that Mr. Pantaleo was Acting Appointing Actuary following the resignation of Mr. Liam McFarlane in October 2019. Mr. Pantaleo's appointment was approved by FA Members for fiscal year 2020 at the FA Annual General Meeting held on February 20, 2020.

(b) The month's current accident year (CAY) claims activities were generally lower than the associated projections from last month. This was particularly the case for the CAY recorded activity. For the third month in a row, the CAY recorded activity was lower than projected by more than 1 standard deviation of the prior 24-months. For two of those months (Nov. 2019 and Jan. 2020), the actual CAY recorded to year-to-date earned premium ratio is the lowest since 2011 (the data we use for striking our assumptions). We are considering the implications.

1.1 Valuation Schedule (Fiscal Year 2020)

The January 2020 Operational Report leverages actuarial assumptions consistent with last month (that is, it does not reflect the results of an updated valuation). The table below summarizes the implemented valuations for fiscal year 2020.

NOVA SCOTIA RISK SHARING POOL
FISCAL YEAR 2020 – SCHEDULE OF VALUATIONS

Valuation Date	Discount Rate (per annum)	Operational Report	Description of Changes
Sep. 30, 2019 (completed)	1.46% mfad 25 bp	Oct. 2019	updated valuation (roll forward) : accident year 2019 loss ratio increased 1.0 points to 97.8%; discount rate increased 5 basis points; no change to selected margins for adverse deviations
Dec. 31, 2019	% mfad -- bp	Mar. 2020	update valuation
Mar. 31, 2020	% mfad -- bp	May 2020	update valuation (roll-forward)
Jun. 30, 2020	% mfad -- bp	Aug. 2020	update valuation
Sep. 30, 2020	% mfad -- bp	Oct. 2020	update valuation (roll-forward)

Under the proposed schedule for fiscal year 2020, the off-half valuation quarters ending March 31, 2020 and September 30, 2020 would not reflect a full valuation update of assumptions, but would rather roll-forward key assumptions from the previous valuation.

1.2 Appointed Actuary and Hybrid Actuarial Services Model

Mr. Cosimo Pantaleo of Ernst & Young LLP (EY) was appointed as Actuary by the FA Board at its February 18, 2020 meeting.

Facility Association operates under a hybrid model in relation to the management and provision of actuarial services. Under this model, actuarial services are performed by both Facility Association's internal staff and its external actuarial consulting firm. The hybrid model approach maximizes the efficiency of resource allocation while providing access to additional expertise and capacity as needed.

1.3 Consideration of Recent Legal Decisions and Changes in Legislation / Regulation[1]

There have been no changes in these descriptions since last month's Highlights, other than clarification that recent refers to events within the last five years.

Consideration and assessment of potential impacts of legal decisions and changes in legislation / regulation constitutes a regular part of the valuation process. Descriptions of some of the more recent (i.e. within the last five years) changes are provided below.

The **Nova Scotia Court of Appeal** confirmed, in a unanimous decision released on **January 18, 2019** in relation to **Sparks v Holland** (**2019 NSCA 3**), that future Canada Pension Plan (CPP) disability benefits are deductible from future income loss awards in motor-vehicle accident claims in that province. Sparks sustained injuries as a result of a motor vehicle accident in Nova Scotia and sought damages for personal injuries and loss of income. The decision supported an earlier decision (Tibbets v Murphy, 2017 NSCA 35) that both past and future CPP disability benefits are deductible under section 133A of the Insurance Act.

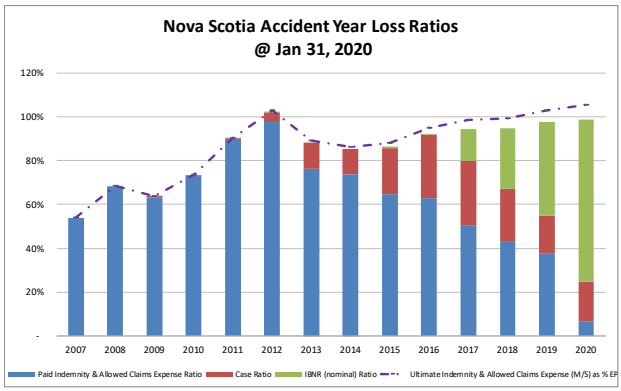
At the current time, no adjustments have been made to our valuation estimates as a result of this decision.

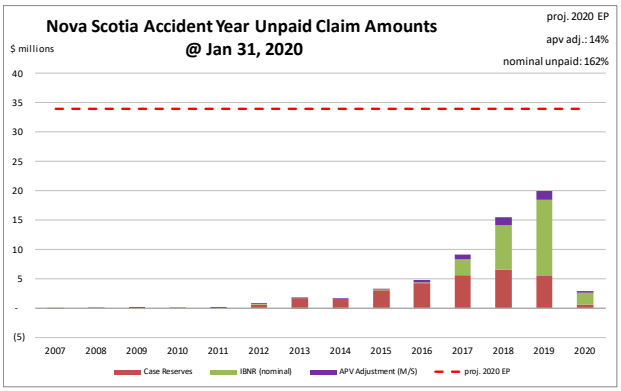
1.4 Current Provision Summary

The charts at the top of the next page show the current levels of claim liabilities[2] booked by accident year. The left chart displays life-to-date payments, case reserves, IBNR, and the total including actuarial present value adjustments against accident year earned premium. The right chart shows the associated dollar amounts for the components of the claim liabilities and the current projected amount of 2020 full year earned premium (the red hash-mark line) to provide some perspective.

[1]This url to a pdf is to a helpful guide on how bills become laws: https://www.ola.org/sites/default/files/common/how-bills-become-law-en.pdf.

[2]Claim liabilities refer to provision for unpaid indemnity and allowed claims expenses. Allowed claims expenses are first party legal and other expenses as listed in the RSP Claims Guide. Claims expenses paid through the member company expense allowance are NOT included in this discussion.





"M/S" refers to "Member Statement" values – that is, actuarial present value adjustments at the selected discount rate.

The current actuarial present value adjustments balance ($4.8 million – see first table on the next page) represents 14% of the earned premium projected for the full year 2020 (see the upper right corner of the right chart at the bottom of the previous page). If our current estimates of the nominal unpaid amounts prove to match actual claims payments, the actuarial present value adjustments will be released into the net operating result over future periods.

claim liabilities ($000s)

	amt	%
case	29,172	49.0%
ibnr	25,570	43.0%
M/S apv adjust.	4,789	8.0%
M/S total	59,531	100.0%

The table to the left breaks down the Member Statement (M/S) claim liabilities total into component parts, showing that the majority of the claim liabilities for this RSP is in case reserves. Approximately 59% of the IBNR balance relates to accident years 2019 and 2020 (see Exhibit B). Approximately 87% of the M/S total claim liabilities are related to accident years 2016-2020 inclusive (i.e. the most recent 5 accident years), and just over 0% is related to accident years 2010 and prior (i.e. prior to the most recent 10 accident years).

The tables below summarize the premium liabilities and the total policy liabilities.

premium liabilities ($000s)

	amt	%
unearned prem	17,556	93.8%
prem def/(dpac)	(10)	(0.1%)
M/S apv adjust.	1,170	6.3%
M/S total	18,716	100.0%

policy liabilities ($000s)

	amt	%
claim	54,742	70.0%
premium	17,546	22.4%
M/S apv adjust.	5,959	7.6%
M/S total	78,247	100.0%

2 Activity During the Month of January 2020

2.1 Recorded Premium and Claims Activity

The table at the top of the next page summarizes the extent to which premiums and claims amounts recorded during the month differ from projections reflected in the prior month's Operational Report[3].

[3]There may be rounding differences in values in this document compared with the associated Bulletin and/or Operational Report.

Nova Scotia RSP Actual vs Projected Summary: Recorded Transaction Amounts ($ thousands)

Table 01	Earned Premium		Paid Indemnity & Allowed Claims Expense		Case increase / (decrease)		Recorded increase / (decrease)	
Accident Year	Actual	Actual less Projected	Actual	Actual less Projected	Actual	Actual less Projected	Actual	Actual less Projected
Prior	5	5	441	(103)	(18)	400	423	297
2018	8	8	176	(110)	(8)	(31)	168	(141)
2019	(29)	(29)	1,173	191	(502)	(70)	671	121
2020	2,842	(25)	187	(96)	520	(469)	707	(565)
TOTAL	2,825	(42)	1,977	(118)	(7)	(169)	1,970	(287)

(Recorded transaction amounts exclude IBNR & other actuarial provisions)

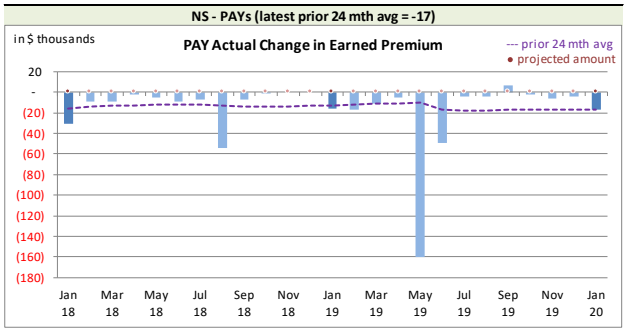
It is unusual to see actual earned premium transactions affecting prior accident years beyond the first prior at this time in the calendar year –prior accident years changes in the month include activity undertaken by a member reflecting recent audit findings.

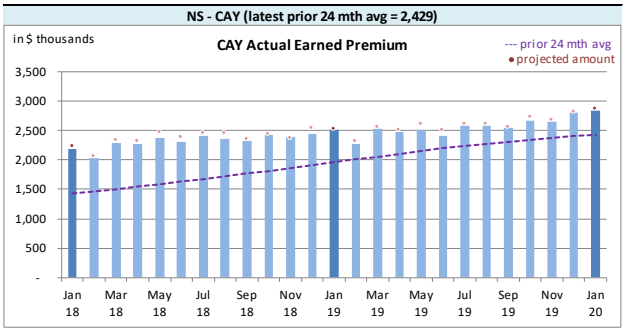
Claims transaction activity is generally volatile and changes from one month to the next are anticipated due to this natural "process variance" (i.e. random variation), and this is particularly true where volumes are low as found in this RSP. Each month, the projection variances are reviewed for signs of projection bias and to identify potential ways to reduce the level of the variance. Commentary from our review is provided in the sub-sections that follow.

2.1.a Actual vs. Projected (AvsP): Earned Premium

The charts below show actual **earned premium**[4] activity in each of the most recent 25 calendar months, along with a "prior 24-month average" to show how each month's actual compares with the average amount of the preceding 24 calendar months.

Nova Scotia RSP Actual **Earned Premium** by Calendar Month





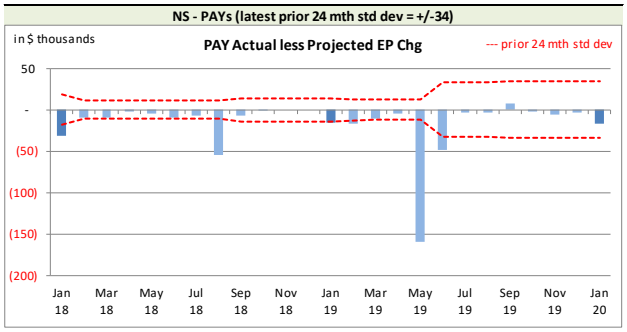
Earned premium changes during a given calendar month in relation to prior accident years tend to be at modest levels, although relatively high levels generally occur at the beginning of each year.

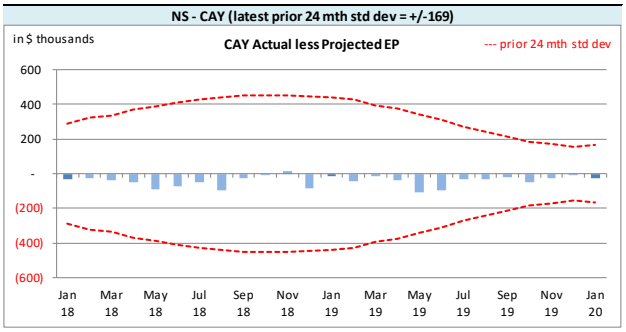
The associated variance between the actual changes and the projections from the previous month are shown in the charts at the top of the next page. **Earned premium** change projections are all attributed to the current accident year as the projection upload does not accept **earned premium** changes for other accident years. We do not see this limitation as being significant for our purposes, but it does

[4]Premium is earned on a daily basis based on the transaction term measured in days. As a result, months with 31 days earned relatively more than those with 30 days, and February earns the least.

mean that the actual less projection variance will equal the actual **earned premium** change in relation to prior accident years.

*Nova Scotia RSP Actual vs. Projected Summary: **Earned Premium** Variances by Calendar Month*





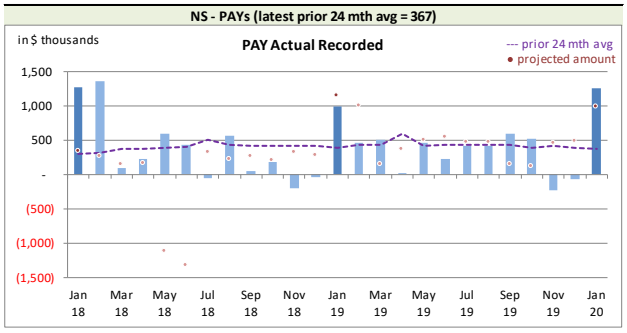
On Latest $ thousands		
Earned Premium	PAYs	CAY
Mthly Avg EP Chg (prior 24 mths)	(17)	2,429
std dev	34	169
A-P <> std dev	6	-
% <> std dev	24.0%	0.0%
norm <> std dev	31.7%	31.7%
performance vs 24-mth avg:	better	better

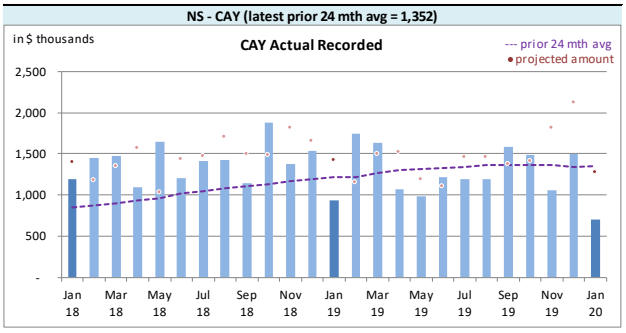
We project **earned premium** changes from known unearned premium and projected written premium levels, but upload the total projections as current accident year (CAY). This process has generated prior accident years' (PAYs) bias[5], with actuals generally lower than projected, although the magnitude is not high relative to monthly premium. In addition to the PAYs' bias, the CAY has also shown bias[6], with actuals being generally lower than projected, and we have modified our projections processes in response. Over time, we may consider other projection approaches to narrow monthly variance levels further, but it is not currently deemed a priority.

2.1.b AvsP: Recorded Indemnity & Allowed Claims Expense

The charts below show actual **recorded** activity (**paid** and case reserve changes), in each of the most recent 25 calendar months, along with a "prior 24-month average" to show how each month's actual compares with the average amount of the preceding 24 calendar months.

*Nova Scotia RSP Actual **Recorded** by Calendar Month*



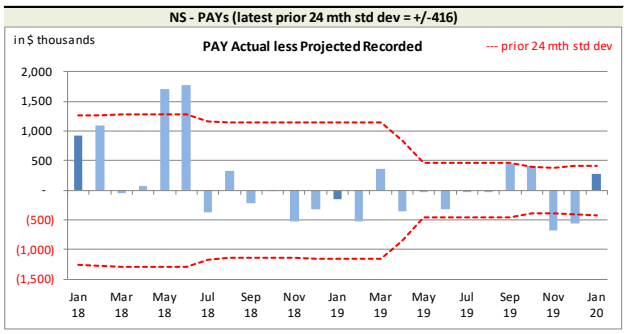


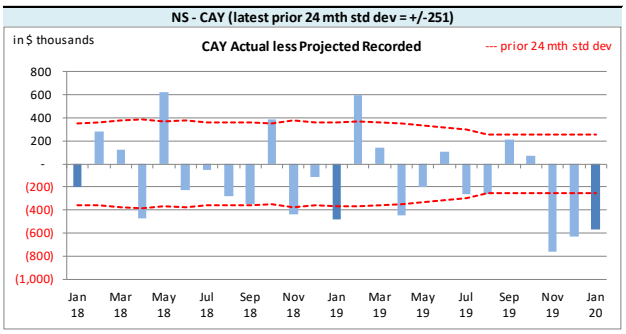
[5]The PAYs' variances will show bias as the projection upload forces all earned premium projections to be attributed to the CAY.

[6]We measure bias based on a 95% confidence range for a binominal distribution with trials based on the range being considered (25 in this case) and 50% probability of success. The rolling 25-month CAY variances at January 2020 has only 1 month where the actuals were higher than projected, and as the 95% confidence range is 8 to 17, bias continues to be indicated.

Recorded activity variances from the previous month's projections are shown in the charts below including the "prior 24-month standard deviation" levels to show how the variances from projection compare with historical standard deviations.

*Nova Scotia RSP Actual vs Projected Summary: **Recorded** Variances by Calendar Month*





On Latest $ thousands		
Recorded	PAYs	CAY
Mthly Avg Recorded (prior 24 mths)	367	1,352
std dev	416	251
A-P <> std dev	5	11
% <> std dev	20.0%	44.0%
norm <> std dev	31.7%	31.7%
performance vs 24-mth avg:	better	worse

With respect to **recorded** indemnity & allowed claims expense activity, caution must be exercised in reviewing the variances as this is a small pool and single claim transactions that are normal course for the business may look unusual and generate relatively significant variances that in nominal value terms are not that significant in relative or overall terms. That said, 20% of prior accident years' (PAYs) **recorded** variances over the last 25 calendar months have fallen outside of one standard deviation of the actual **recorded** amounts (see table above), suggesting the projection process has performed better than simply projecting the prior 24-month average amount (assuming it follows a normal distribution). Bias has not been indicated at a 95% confidence level on a rolling 25-month basis (10 of 25 variances are positive).

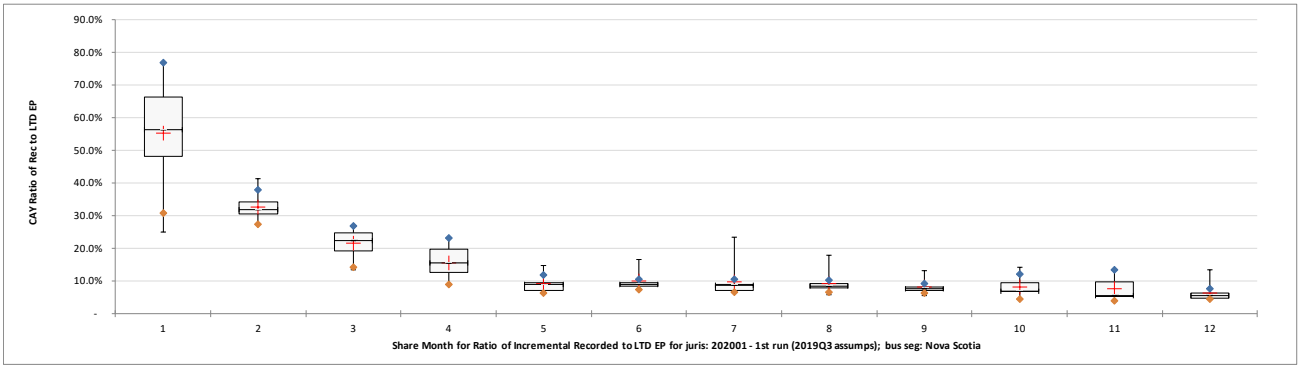
The current accident year (CAY) **recorded** variances fell outside of one standard deviation 44% of the time over the last 25 calendar months (see table above), suggesting that the projection process has performed worse than simply projecting the prior 24-month average amount. We are considering ways to improve our projection process as a result, but efforts so far have fallen short (although rapid growth may be hampering our projection capabilities). Bias has not been indicated at a 95% confidence level on a rolling 25-month basis (9 of 25 variances are positive).

The CAY **recorded** variance was outside of the one standard deviation band this month (see right chart above). The activity was reviewed and verified. Our projections leverage historical CAY recorded in share month to year-to-date earned premium ratios. These are summarized in the table and box and whisker plot at the top of the next page.

Nova Scotia RSP – CAY Recorded in month to YTD Earned Premium as at Jan. 31, 2020

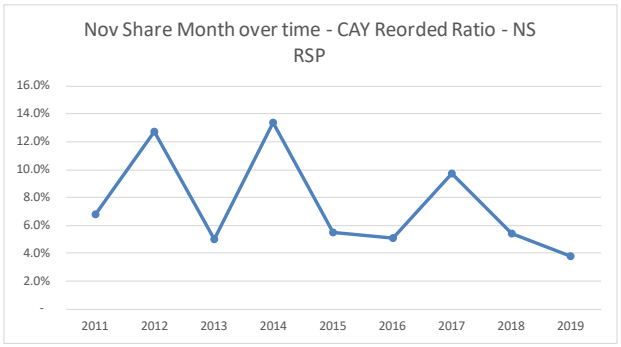
CAY	Share Month for Ratio of Incremental Recorded to LTD EP for juris: 202001 - 1st run (2019Q3 assumps); bus seg: Nova Scotia											
Share Year	1	2	3	4	5	6	7	8	9	10	11	12
2011	62.2%	30.8%	21.5%	23.1%	8.8%	13.4%	8.7%	7.9%	7.9%	6.8%	6.8%	6.5%
2012	58.0%	27.4%	24.6%	15.4%	6.7%	16.6%	23.4%	8.4%	8.1%	14.1%	12.7%	13.3%
2013	70.9%	41.2%	16.8%	20.2%	9.5%	9.5%	7.1%	17.8%	9.5%	9.5%	5.0%	4.7%
2014	67.6%	30.5%	26.9%	16.4%	8.9%	7.5%	9.6%	9.1%	7.5%	6.9%	13.4%	4.5%
2015	45.9%	31.7%	26.2%	19.8%	7.0%	8.4%	8.9%	5.7%	7.6%	4.5%	5.5%	4.4%
2016	54.3%	32.3%	13.3%	8.8%	6.4%	7.3%	7.3%	7.8%	6.1%	6.9%	5.1%	6.2%
2017	76.7%	27.6%	19.2%	13.6%	11.7%	9.5%	6.6%	10.6%	13.1%	9.7%	9.7%	6.2%
2018	54.5%	34.3%	22.7%	12.5%	14.8%	9.0%	8.9%	7.8%	5.6%	8.2%	5.4%	5.5%
2019	37.3%	36.6%	22.4%	10.9%	8.0%	8.3%	6.9%	8.6%	7.1%	5.9%	**3.8%**	**4.9%**
2020	24.9%											

CAY	Share Month for Ratio of Incremental Recorded to LTD EP for juris: 202001 - 1st run (2019Q3 assumps); bus seg: Nova Scotia											
Share Year	1	2	3	4	5	6	7	8	9	10	11	12
count	10	9	9	9	9	9	9	9	9	9	9	9
max	76.7%	41.2%	26.9%	23.1%	14.8%	16.6%	23.4%	17.8%	13.1%	14.1%	13.4%	13.3%
3rd Q + 0.95 x IQR	76.7%	37.9%	26.9%	23.1%	11.9%	10.6%	10.6%	10.3%	9.1%	12.1%	13.4%	7.6%
3rd Q	66.3%	34.3%	24.6%	19.8%	9.5%	9.5%	8.9%	9.1%	8.1%	9.5%	9.7%	6.2%
median	**56.3%**	**31.7%**	**22.4%**	**15.4%**	**8.8%**	**9.0%**	**8.7%**	**8.4%**	**7.6%**	**6.9%**	**5.5%**	**5.5%**
1st Q	48.0%	30.5%	19.2%	12.5%	7.0%	8.3%	7.1%	7.8%	7.1%	6.8%	5.1%	4.7%
1st Q - 0.95 x IQR	30.7%	27.4%	14.1%	8.8%	6.4%	7.3%	6.6%	6.6%	6.2%	4.5%	3.8%	4.4%
min	24.9%	27.4%	13.3%	8.8%	6.4%	7.3%	6.6%	5.7%	5.6%	4.5%	3.8%	4.4%
average	**55.2%**	**32.5%**	**21.5%**	**15.6%**	**9.1%**	**9.9%**	**9.7%**	**9.3%**	**8.1%**	**8.1%**	**7.5%**	**6.2%**
std dev	15.8%	4.4%	4.4%	4.7%	2.7%	3.1%	5.2%	3.4%	2.2%	2.8%	3.6%	2.8%
coeff var	**28.6%**	**13.5%**	**20.5%**	**30.1%**	**29.7%**	**31.3%**	**53.6%**	**36.6%**	**27.2%**	**34.6%**	**48.0%**	**45.2%**
SUGGESTED	**56.3%**	**31.7%**	**22.4%**	**15.4%**	**8.8%**	**9.0%**	**8.7%**	**8.4%**	**7.6%**	**6.9%**	**5.5%**	**5.5%**



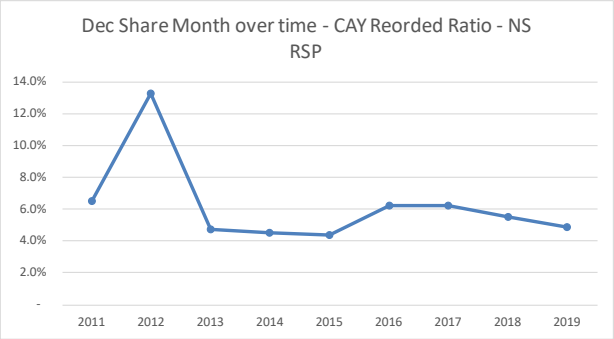
In our selections, we consider the average and median ratios known at the time, as well as the recorded amount estimated by our selections. The ratios for the latest 3 share months are discussed below.

- Nov 2019: avg: +8.0%, median: +6.2%, sel +6.6%, actual: +3.8%:
  - the actual at +3.8% was lowest of history available, but only marginally so
  - as per the chart on the right, Nov's recorded ratio to year-to-date earned premium exhibits significant volatility, having the second highest coefficient of variation of any month (July has the highest)

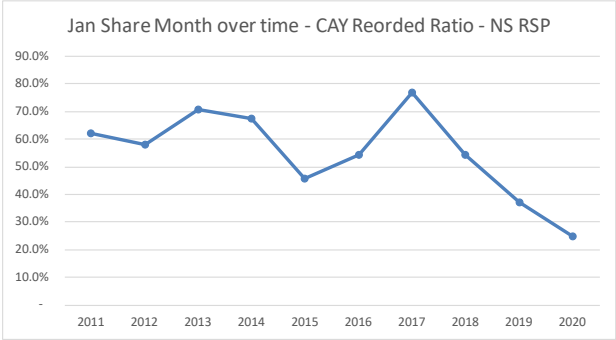


  - low volumes contribute to the relatively high levels of monthly coefficient of variation (the larger RSPs typically have coefficients of variation in the mid-twenties)

- Dec 2019: avg: +6.4%, median: +5.9%, sel +7.0%, actual: +4.9%
  - our selected ratio for Dec 2019 was not only higher than the historical average and median, it was also higher than all historical ratios other than 2012
  - as a result, we attributed last month's variance to a poor projection



- Jan 2020: avg: +58.6%, median: +58.0%, sel +44.8%, actual: +24.9%
  - Jan actual at +24.9% was lowest of history available, beating out the previous low recorded in 2019

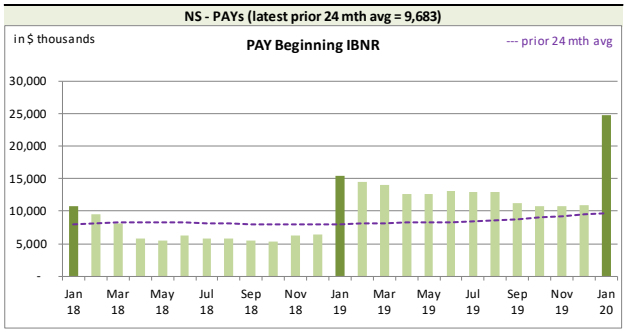


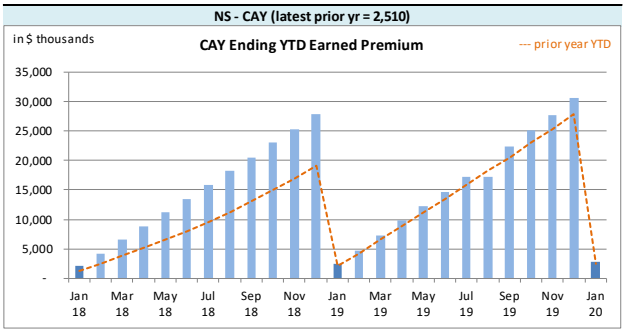
For each of the last three projections, the actual recorded activity was significantly lower than projected with both November 2019 and January 2020 representing record lows relative to the experience since share year 2011, as is clear from the preceding charts. We are considering the implications as to whether this is process variance, an indication of data quality / reporting issues, or a change in reporting patterns.

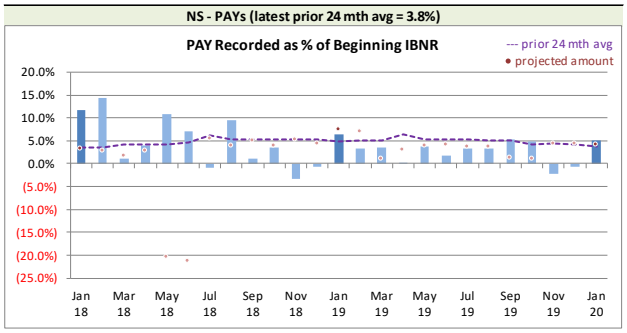
The method for establishing IBNR adjusts automatically for changes in **earned premium** and **recorded** claims activity level (see sections 2.2 and 3).

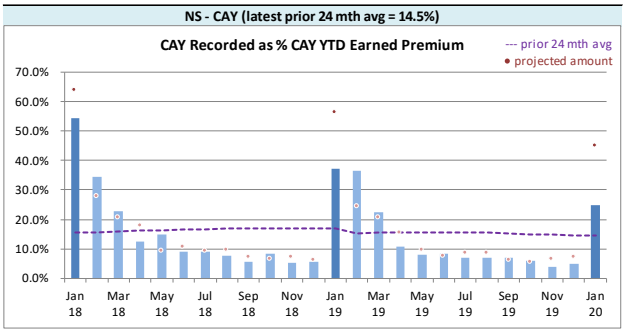
We have included, for reference, additional charts at the top of the next page related to levels influencing **recorded** activity. Note in particular the increase in the level of PAY beginning IBNR. Part of this will be as a response to valuations and showing up as a beginning IBNR change one month after the valuation is implemented (i.e. April, June, September, and November), and part will also reflect the maturity level of the RSP.

Nova Scotia RSP Levels that influence[7] ***Recorded*** *activity by Calendar Month*









We track PAY beginning IBNR as **recorded** activity comes out of IBNR. Changes in the PAY beginning IBNR (see left chart above) occur for several possible reasons:

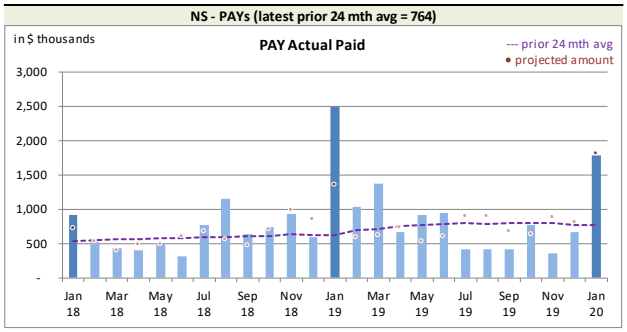
- to offset actual **recorded** activity (through loss ratio matching);
- the annual switchover as a CAY becomes a PAY (occurs in January); and
- when a new valuation is implemented, where the valuation resulted in changes to the selection of PAYs' ultimates (will show up as a beginning IBNR change one month after the valuation is implemented, i.e. the change will generally show in April, June, September, and November).

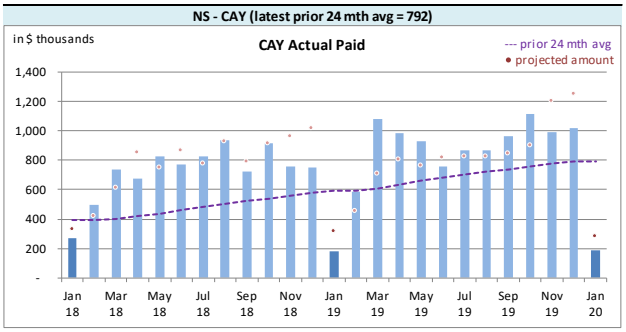
2.1.c AvsP: Paid Indemnity & Allowed Claims Expense

The charts at the top of the next page show actual **paid** activity in each of the most recent 25 calendar months, along with a "prior 24-month average" to show how each month's actual compares with the average amount of the preceding 24 calendar months.

[7]Our recorded activity projections for the prior accident years are based on selected ratios of recorded activity to beginning unpaid balances, whereas the current accident year projections are based on selected ratios of year-to-date IBNR to year-to-date selected ultimate (i.e. selected LR x earned premium), deriving year-to-date recorded as selected ultimate less IBNR. In both cases, the ratio selection is based on our review of the more recent recorded activity and recent AvsP analyses.

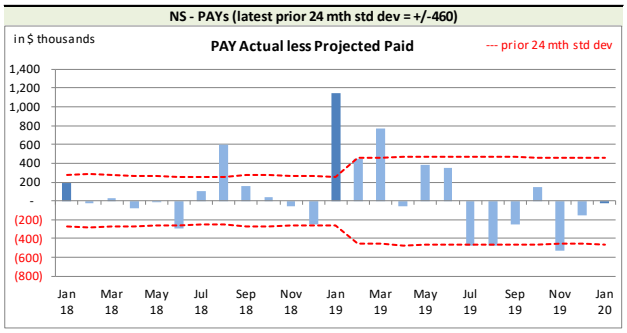
*Nova Scotia RSP Actual **Paid** by activity Calendar Month*

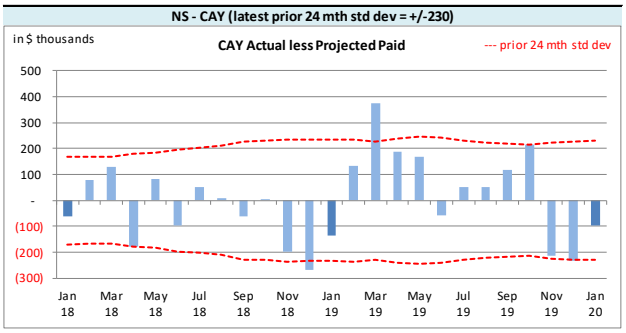




Paid activity variances from the previous month's projections are shown in the charts below, including the "prior 24-month standard deviation" levels to show how the variances from projection compare with historical standard deviations.

*Nova Scotia RSP Actual vs Projected Summary: **Paid** Variances by Calendar Month*





On Latest $ thousands		
Paid	PAYs	CAY
Mthly Avg Paid (prior 24 mths)	764	792
std dev	460	230
A-P <> std dev	7	4
% <> std dev	28.0%	16.0%
norm <> std dev	31.7%	31.7%
performance vs 24-mth avg:	no better	better

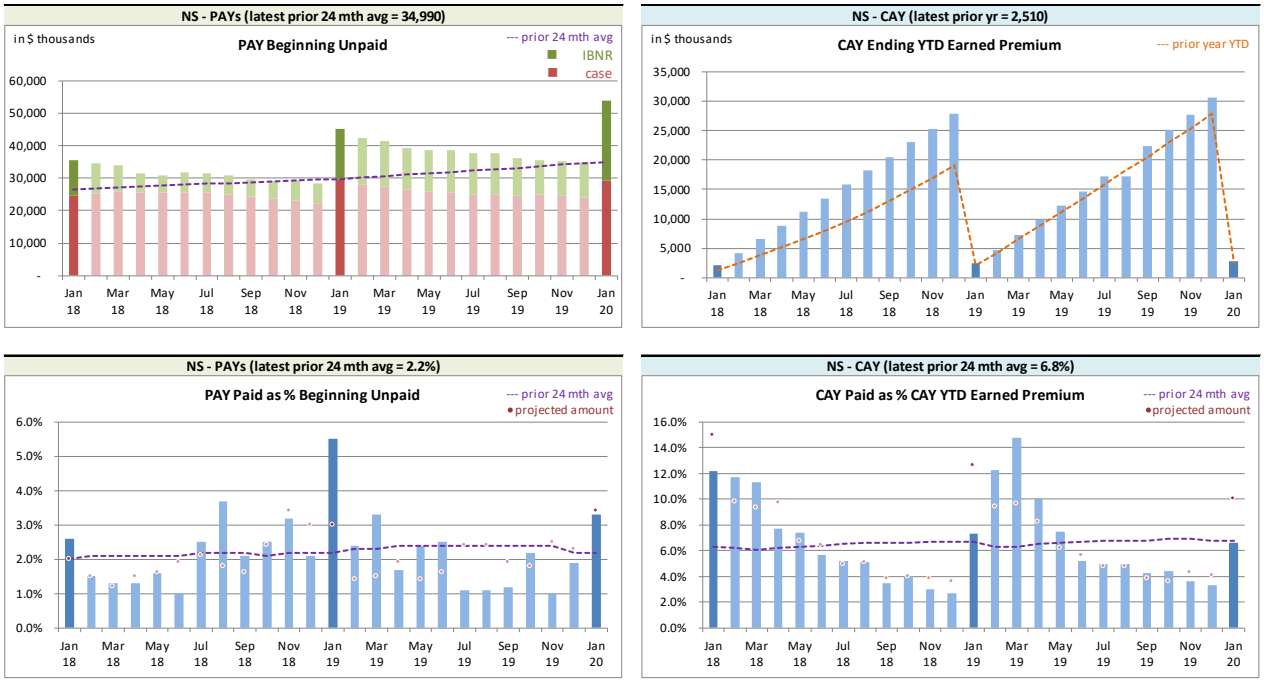
With respect to **paid** indemnity & allowed claims expense activity, caution must be exercised in reviewing the variances as this is a small pool and single claim transactions that are normal course for the business may look unusual and generate relatively significant variances that in nominal value terms are not that significant in relative or overall terms. That said, 28% of the prior accident years' (PAYs) variances over the last 25 calendar months have fallen outside of one standard deviation of the actual **paid** amounts (see table on above), suggesting the projection process has performed no better than simply projecting the prior 24-month average amount (assuming it follows a normal distribution). Bias has not been indicated at a 95% confidence level on a rolling 25-month basis (12 of 25 variances are positive).

The current accident year (CAY) **paid** variances fell outside of one standard deviation 16% of the time over the last 25 calendar months (see table above), suggesting that the projection process has performed better than simply projecting the prior 24-month average amount. Bias has not been indicated at a 95% confidence level on a rolling 25-month basis (14 of 25 variances are positive).

We have included, for reference, additional charts at the top of the next page related to levels influencing **paid** activity. Both case and IBNR increases contribute to the increase of PAY beginning

unpaid. This is somewhat expected, given the maturity level of the RSP.

*Nova Scotia RSP Levels that influence[8] **Paid** activity by Calendar Month*



We track the PAY beginning unpaid balance (case and IBNR) as **paid** activity comes out of the unpaid balance. Changes in the PAY beginning unpaid balance (see upper left chart above) occur for several possible reasons:

- to offset actual **paid** activity (may reduce case or IBNR or both);
- the annual switchover as a CAY becomes a PAY (occurs in January); and
- when a new valuation is implemented, where the valuation resulted in changes to the selection of PAYs' ultimates (will show up as a beginning unpaid balance change one month after the valuation is implemented, i.e. the change will generally show in April, June, September, and November).

2.2 Actuarial Provisions

An ultimate loss ratio matching method (described in section 3) was used to determine the month's IBNR[9], and factors were applied to the nominal unpaid claims liability (case plus IBNR) to determine the discount amount (shown as a negative value to indicate its impact of reducing the liability) and the Provisions for Adverse Deviations. The loss ratios and the factors used to determine the current month's provisions and projections were based on the applicable valuation.

[8]Our paid projections for the prior accident years are based on selected ratios of paid to beginning unpaid balances, whereas the current accident year projections are based on selected ratios of year-to-date paid to year-to-date selected ultimate indemnity (i.e. selected LR x earned premium). In both cases, the ratio selection is based on our review of the more recent recorded activity and recent AvsP analyses.

[9]For ease of discussion, "IBNR" is used in place of "provisions for incurred but not recorded (IBNR) and development".

The table below summarizes variances in provisions included in this month's Operational Report and the associated one-month projections from last month's Report.

Nova Scotia RSP Actual vs Projected Summary: IBNR and APV Amounts ($ thousands)

Table 02

	IBNR		actuarial present value adjustments: Discount Amount		Provisions for Adverse Deviations		IBNR + actuarial present value adjustments	
Accident Year	Actual	Actual less Projected	Actual	Actual less Projected	Actual	Actual less Projected	Actual	Actual less Projected
Prior	2,855	(292)	(487)	(8)	2,258	13	4,626	(287)
2018	7,558	148	(467)	(4)	1,767	15	8,858	159
2019	13,062	(150)	(719)	8	2,237	(27)	14,580	(169)
2020	2,095	540	(118)	(4)	318	9	2,295	545
TOTAL	25,570	246	(1,791)	(8)	6,580	10	30,359	248

The IBNR provision is $0.2 million higher than projected from last month, counterbalancing the recorded claims activity and adjusting for the earned premium variance impacts indicated in section 2.1.

Exhibit G shows the accident year IBNR amount change from last month to this month broken down into:

(i) the change projected last month;

(ii) the additional change due to variances in earned premium (because we apply a loss ratio to earned premium in determining ultimate level) and/or recorded claims (as IBNR is calculated as ultimate less recorded) differences; and

(iii) the additional change due to valuation implementation impacts (as applicable)

The variances associated with (ii) above are discussed in sections 2.1.a and 2.1.b.

The table at the top of the next page summarizes the variances in the provisions for premium deficiency liability / (deferred policy acquisition cost asset) included this month's Operational Report and the one-month projections from last month's Report. This RSP is in a deferred policy acquisition cost asset position (shown as a negative value) prior to actuarial present value adjustments and in a premium deficiency position (shown as a positive value) after actuarial present value adjustments. Actuarial present value adjustments increase the liability value as the adjustments increase the expected future policy obligations (costs) associated with the unearned premium. The variances noted are mainly driven by the unearned premium variance.

Nova Scotia RSP Actual vs Projected Summary: Premium Deficiency / (DPAC) Amounts ($ thousands)

Table 03

	Premium Deficiency / (Deferred Policy Acquisition Costs)		actuarial present value adjustments		Premium Deficiency / (DPAC) including actuarial present value adjustments	
	Actual	Actual less Projected	Actual	Actual less Projected	Actual	Actual less Projected
balance:	(10)	0	1,170	9	1,160	9
balance as % unearned premium:	(0.1%)	-	6.7%	-	6.6%	-
actual unearned premium:	17,556					
less projected:	108					

3 Ultimate Loss Ratio Matching Method

An "ultimate loss ratio matching method" continues to be applied to the current month and two projected months shown in the Operational Reports, with IBNR determined by accident year as follows:

(a) Earned premium to-date
(b) Ultimate loss[10] ratio per latest valuation
(c) Estimated ultimate incurred = (a) x (b)
(d) Recorded indemnity & allowed claims expense to-date
(e) IBNR = (c) – (d)

4 Calendar Year-to-Date Results

The table at the top of the next page summarizes the calendar year-to-date results for indemnity & allowed claims expenses[11], including IBNR.

In calculating the amounts as percentages of earned premium, the calendar year-to-date earned premium has been used, which includes not only the earned premium associated with the current accident year, but also earned premium adjustments related to prior accident years. Specifically, the current accident year (CAY) ratio in the table is 99.2% rather than 98.6% (the valuation ultimate ratio for accident year 2020), as the calendar year-to-date earned premium includes prior accident year earned premium adjustments. (Note that the ratios in this table may differ slightly from those shown in the Nova Scotia RSP Summary of Operations due to rounding.)

[10]"Loss" here refers to indemnity and allowed claims expenses, but does not include the claims expense allowance included in member company overall expense allowances ("Expense Allowance" in the Operational Report).

[11]Allowed claims expenses are first party legal and other expenses as listed in the RSP Claims Guide. Claims expenses paid through the member company expense allowance are NOT included in this analysis.

Nova Scotia RSP Calendar Year-to-Date Indemnity & Allowed Claims Expense Summary ($ thousands)

Table 04	YTD Nominal Values		YTD actuarial present value adjustment		YTD Total		Change from Prior Month YTD	
	Amount	% EP	Amount	% EP	Amount	% EP	Amount	LR pts
PAYs	(17)	(0.6%)	92	3.3%	75	2.7%	#N/A	#N/A
CAY	2,802	99.2%	200	7.1%	3,002	106.3%	#N/A	#N/A
TOTAL	2,786	98.6%	292	10.3%	3,078	108.9%	#N/A	#N/A

("% EP" based on 2019 calendar year-to-date earned premium; ratios may not total due to rounding)

In general, prior accident years (PAYs) changes from last month are due to the release of the actuarial present value adjustments with claims payments, except when valuations are implemented. The loss ratio change year-to-date in Table 04 reflects not only changes in the prior accident year levels, but also the increase in the calendar year-to-date earned premium with an additional month's earned premium.

For the current accident year (CAY), changes in the year-to-date total reflects the additional month's exposure and regular changes to actuarial present value adjustments as the year ages.

5 Current Operational Report – Additional Exhibits

Section 6 provides exhibits pertaining to the actuarial provisions reflected in the current month's Operational Report.

IBNR (including actuarial present value adjustments) presented in section 6, Exhibit A, were derived on a discounted basis, and therefore reflect the time value of money and include an explicit provision for adverse deviations in accordance with accepted actuarial practice in Canada.

IBNR presented in section 6, Exhibit B, does NOT include any actuarial present value adjustments. The "Total IBNR" from this exhibit is shown in the Operational Report as "Undiscounted IBNR".

The ultimate loss ratios detailed in section 6, Exhibit B, refer to the estimates derived on the basis of various actuarial methodologies applied to the experience of the Nova Scotia Risk Sharing Pool for the purposes of the most recent quarterly valuation. As discussed in section 3, IBNR reflected in the current month's Operational Report was derived as the difference between the estimated ultimate for the claims amount (i.e. earned premium x ultimate loss ratio) and the associated current recorded amounts (life-to-date payments plus current case reserves).

6 EXHIBITS

The exhibits listed below are provided on the pages that follow:

EXHIBIT A IBNR for Member Sharing – includes Actuarial Present Value Adjustments

EXHIBIT B IBNR

EXHIBIT C Premium Liabilities

EXHIBIT D Projected Year-end Policy Liabilities

EXHIBIT E Discount Rate & Margins for Adverse Deviations

EXHIBIT F Interest Rate Sensitivity

EXHIBIT G Components of IBNR Change During Month

EXHIBIT A

IBNR for Member Sharing – includes Actuarial Present Value Adjustments

TABLE EXHIBIT A

Amounts in $000s

IBNR + M/S actuarial present value adjustments

discount rate 1.46%

interest rate margin 25 basis pts

Accident Year	Actual Dec. 2019	Actual Jan. 2020	Projected Feb. 2020	Projected Mar. 2020	Projected Dec. 2020
2007	(1)	(1)	(1)	(1)	(1)
2008	2	2	2	2	2
2009	10	10	10	10	9
2010	4	4	4	4	4
2011	15	8	8	8	8
2012	89	108	107	105	91
2013	134	87	85	83	73
2014	126	105	104	102	89
2015	336	335	330	326	289
2016	684	468	462	456	371
2017	3,633	3,500	3,375	3,289	2,550
2018	8,952	8,858	8,530	8,286	6,480
2019	15,267	14,580	14,030	13,624	10,764
2020	-	2,295	3,267	4,457	15,222
2021	-	-	-	-	-
TOTAL	29,251	30,359	30,313	30,751	35,951
Change		1,108	(46)	438	

Please see Exhibit G, page 1 for Components of Change during Current Month

EXHIBIT B

IBNR

TABLE EXHIBIT B — Amounts in $000s

IBNR

Ultimate Loss Ratio	Accident Year	Actual Dec. 2019	Actual Jan. 2020	Projected Feb. 2020	Projected Mar. 2020	Projected Dec. 2020
53.9%	2007	(1)	(1)	(1)	(1)	(1)
68.3%	2008	2	2	2	2	2
63.8%	2009	5	5	5	5	5
73.4%	2010	4	4	4	4	4
90.2%	2011	6	6	6	6	6
102.5%	2012	34	66	65	64	53
88.1%	2013	1	(39)	(39)	(39)	(36)
85.2%	2014	5	(14)	(14)	(14)	(14)
86.4%	2015	92	86	85	84	72
92.0%	2016	244	24	23	23	16
94.4%	2017	2,881	2,716	2,607	2,529	1,877
94.6%	2018	7,719	7,558	7,256	7,038	5,408
97.8%	2019	13,762	13,062	12,540	12,164	9,524
98.6%	2020	-	2,095	2,922	3,956	13,399
102.1%	2021	-	-	-	-	-
	TOTAL	24,754	25,570	25,461	25,821	30,315
	Change		816	(109)	360	

Please see Exhibit G, page 2 for Components of Change during Current Month

EXHIBIT C

Premium Liabilities

TABLE EXHIBIT C	Amounts in $000s				
Premium Liabilities	Actual Dec. 2019	Actual Jan. 2020	Projected Feb. 2020	Projected Mar. 2020	Projected Dec. 2020
(1) unearned premium (UP)	18,213	17,556	15,772	16,788	16,949
FOR MEMBER SHARING					
(2) expected future costs ratio {% of (1)}	106.6%	106.6%	106.6%	106.8%	110.3%
(3) expected future costs {(1) x (2)}	19,412	18,716	16,816	17,931	18,698
(4) premium deficiency / (deferred policy acquisition cost)	1,199	1,160	1,044	1,143	1,749
Excluding Actuarial Present Value Adjustments					
(5) expected future costs ratio {% of (1)}	99.9%	99.9%	100.0%	100.1%	103.4%
(6) expected future costs {(1) x (5)}	18,200	17,546	15,767	16,811	17,530
(7) premium deficiency / (deferred policy acquisition cost)	(13)	(10)	(5)	23	581

EXHIBIT D

Projected Year-end Policy Liabilities

The table below presents the projected policy liabilities as at December 31, 2020, broken down by component.

Nova Scotia	Projected Balances as at Dec. 31, 2020 ($000s)									
ending 2020	nominal values			actuarial present value adjustments (apvs)						
Acc Yr	Case	IBNR	Total Unpaid	discount	investment PfAD	nominal development PfAD	development PfAD discount	development PfAD	Total apvs	TOTAL
2007	-	(1)	(1)	-	-	-	-	-	-	(1)
2008	-	2	2	-	-	-	-	-	-	2
2009	57	5	62	(2)	-	6	-	6	4	66
2010	-	4	4	-	-	-	-	-	-	4
2011	16	6	22	-	-	2	-	2	2	24
2012	523	53	576	(22)	4	58	(2)	56	38	614
2013	1,467	(36)	1,431	(36)	6	143	(4)	139	109	1,540
2014	1,315	(14)	1,301	(29)	5	130	(3)	127	103	1,404
2015	2,609	72	2,681	(54)	8	268	(5)	263	217	2,898
2016	3,424	16	3,440	(79)	14	430	(10)	420	355	3,795
2017	5,234	1,877	7,111	(192)	28	860	(23)	837	673	7,784
2018	6,250	5,408	11,658	(385)	70	1,434	(47)	1,387	1,072	12,730
2019	5,541	9,524	15,065	(588)	105	1,793	(70)	1,723	1,240	16,305
PAYs (sub-total):	26,436	16,916	43,352	(1,387)	240	5,124	(164)	4,960	3,813	47,165
CAY (2020)	10,385	13,399	23,784	(1,070)	190	2,830	(127)	2,703	1,823	25,607
claims liabilities:	36,821	30,315	67,136	(2,457)	430	7,954	(291)	7,663	5,636	72,772
	Unearned Premium	Premium Deficiency / (DPAC)	Total Provision	discount	investment PfAD	nominal development PfAD	development PfAD discount	development PfAD	Total apvs	TOTAL*
premium liabilities:	16,949	581	17,530	(606)	104	1,731	(61)	1,670	1,168	18,698
										*Total may not be sum of parts, as apvs apply to future costs within UPR
policy liabilities:			**84,666**	**(3,063)**	**534**	**9,685**	**(352)**	**9,333**	**6,804**	**91,470**

EXHIBIT E

Discount Rate & Margins for Adverse Deviations

The tables below present selected margins for adverse development by coverage (the total is a weighted average, based on the unpaid claims projection for December 31, 2019 from the valuation), followed by the selected discount rate and the associated margin for investment income.

Selected Claims Development MfADs (Sep. 30, 2019)

Accident Year	Third Party Liability	Accident Benefits	Other Coverages	Total
	Margins	Margins	Margins	Margins
2007	10.0%	10.0%	10.0%	10.0%
2008	10.0%	10.0%	10.0%	10.0%
2009	10.0%	10.0%	10.0%	10.0%
2010	10.0%	10.0%	10.0%	10.0%
2011	10.0%	10.0%	10.0%	10.0%
2012	10.0%	10.0%	10.0%	10.0%
2013	10.0%	10.0%	10.0%	10.0%
2014	10.0%	10.0%	10.0%	10.0%
2015	10.0%	10.0%	9.3%	10.0%
2016	12.5%	10.0%	12.5%	12.5%
2017	12.5%	10.0%	10.4%	12.1%
2018	12.5%	10.0%	12.5%	12.3%
2019	12.4%	10.0%	5.5%	11.9%
2020	11.9%	10.0%	5.1%	10.0%
prem liab	11.9%	10.0%	5.1%	10.0%

discount rate:	1.46%
margin (basis points):	25

EXHIBIT F

Interest Rate Sensitivity

The tables below present sensitivity to the member statement claims liability as projected to Dec. 31, 2019 from the latest valuation date (projections in exhibits A to D are to Dec. 31, 2020, and are based on more up-to-date information). We have included the most recent valuation selection (1.46%), the prior valuation assumption (1.41%) and the prior fiscal year end valuation assumption (2.28%) for comparative purposes. A 25 basis point margin for investment return adverse deviation is used in all scenarios presented.

$ Format: $000s

	Actuarial Present Value of Provisions at Various Discount Rates - Dec. 31, 2019 projected Unpaid							
AY	0.46%	0.96%	1.46%	1.96%	2.46%	2.96%	1.41%	2.28%
2007	-	-	-	-	-	-	-	-
2008	-	-	-	-	-	-	-	-
2009	70	70	69	68	68	67	69	68
2010	-	-	-	-	-	-	-	-
2011	148	146	144	142	141	139	144	141
2012	799	793	786	779	773	766	786	775
2013	1,499	1,488	1,477	1,466	1,455	1,445	1,478	1,459
2014	1,270	1,261	1,253	1,244	1,236	1,228	1,253	1,239
2015	3,693	3,663	3,635	3,606	3,579	3,552	3,637	3,589
2016	5,061	5,013	4,966	4,920	4,874	4,830	4,970	4,890
2017	9,113	9,008	8,907	8,807	8,710	8,615	8,916	8,745
2018	15,680	15,467	15,261	15,061	14,866	14,674	15,282	14,935
2019	21,561	21,222	20,894	20,576	20,267	19,964	20,927	20,377
Total	58,894	58,131	57,392	56,669	55,969	55,280	57,462	56,218
	curr - 100 bp	curr - 50 bp	curr val assumption	curr + 50bp	curr + 100bp	curr + 150bp	prior val assumption	prior fyr end assumption

	Dollar Impact Relative to Valuation Assumption							
AY	0.46%	0.96%	1.46%	1.96%	2.46%	2.96%	1.41%	2.28%
Total	1,502	739	-	(723)	(1,423)	(2,112)	70	(1,174)
	curr - 100 bp	curr - 50 bp	curr val assumption	curr + 50bp	curr + 100bp	curr + 150bp	prior val assumption	prior fyr end assumption

	Percentage Impact Relative to Valuation Assumption							
AY	0.46%	0.96%	1.46%	1.96%	2.46%	2.96%	1.41%	2.28%
2007	-	-	-	-	-	-	-	-
2008	-	-	-	-	-	-	-	-
2009	1.4%	1.4%	-	(1.4%)	(1.4%)	(2.9%)	-	(1.4%)
2010	-	-	-	-	-	-	-	-
2011	2.8%	1.4%	-	(1.4%)	(2.1%)	(3.5%)	-	(2.1%)
2012	1.7%	0.9%	-	(0.9%)	(1.7%)	(2.5%)	-	(1.4%)
2013	1.5%	0.7%	-	(0.7%)	(1.5%)	(2.2%)	0.1%	(1.2%)
2014	1.4%	0.6%	-	(0.7%)	(1.4%)	(2.0%)	-	(1.1%)
2015	1.6%	0.8%	-	(0.8%)	(1.5%)	(2.3%)	0.1%	(1.3%)
2016	1.9%	0.9%	-	(0.9%)	(1.9%)	(2.7%)	0.1%	(1.5%)
2017	2.3%	1.1%	-	(1.1%)	(2.2%)	(3.3%)	0.1%	(1.8%)
2018	2.7%	1.3%	-	(1.3%)	(2.6%)	(3.8%)	0.1%	(2.1%)
2019	3.2%	1.6%	-	(1.5%)	(3.0%)	(4.5%)	0.2%	(2.5%)
Total	2.6%	1.3%	-	(1.3%)	(2.5%)	(3.7%)	0.1%	(2.0%)
	curr - 100 bp	curr - 50 bp	curr val assumption	curr + 50bp	curr + 100bp	curr + 150bp	prior val assumption	prior fyr end assumption

EXHIBIT G

Components of Member Statement IBNR (i.e. "Discounted") Change During Month

RSP	**Nova Scotia**
AccountCode Desc	**IBNR - Discounted**

M/S IBNR - in $000s

	Values						
AccYear	**Sum of Prior Month Actual Amount**	**Sum of Projected Change**	**Sum of Change Due to AvsP Variances**	**Sum of Change Due to Valuation Implementation**	**Sum of Total Change**	**Sum of % Total Change**	**Sum of Current Month Final Amount**
2007	(1)	-	-	-	-	-	(1)
2008	2	-	-	-	-	-	2
2009	10	2	(2)	-	-	-	10
2010	4	-	-	-	-	-	4
2011	15	5	(12)	-	(7)	(46.7%)	8
2012	89	(11)	30	-	19	21.3%	108
2013	134	(12)	(35)	-	(47)	(35.1%)	87
2014	126	(6)	(15)	-	(21)	(16.7%)	105
2015	336	(4)	3	-	(1)	(0.3%)	335
2016	684	-	(216)	-	(216)	(31.6%)	468
2017	3,633	(93)	(40)	-	(133)	(3.7%)	3,500
2018	8,952	(253)	159	-	(94)	(1.1%)	8,858
2019	15,267	(518)	(169)	-	(687)	(4.5%)	14,580
2020	-	1,750	545	-	2,295	100.0%	2,295
Grand Total	**29,251**	**860**	**248**	**-**	**1,108**	**3.8%**	**30,359**

EXHIBIT G

Components of IBNR (i.e. "Undiscounted") Change During Month

RSP	**Nova Scotia**
AccountCode Desc	**IBNR - Undiscounted**

IBNR - in $000s

	Values						
AccYear	**Sum of Prior Month Actual Amount**	**Sum of Projected Change**	**Sum of Change Due to AvsP Variances**	**Sum of Change Due to Valuation Implementation**	**Sum of Total Change**	**Sum of % Total Change**	**Sum of Current Month Final Amount**
2007	(1)	-	-	-	-	-	(1)
2008	2	-	-	-	-	-	2
2009	5	-	-	-	-	-	5
2010	4	-	-	-	-	-	4
2011	6	-	-	-	-	-	6
2012	34	-	32	-	32	94.1%	66
2013	1	-	(40)	-	(40)	(4,000.0%)	(39)
2014	5	-	(19)	-	(19)	(380.0%)	(14)
2015	92	(1)	(5)	-	(6)	(6.5%)	86
2016	244	(10)	(210)	-	(220)	(90.2%)	24
2017	2,881	(115)	(50)	-	(165)	(5.7%)	2,716
2018	7,719	(309)	148	-	(161)	(2.1%)	7,558
2019	13,762	(550)	(150)	-	(700)	(5.1%)	13,062
2020	-	1,555	540	-	2,095	100.0%	2,095
Grand Total	**24,754**	**570**	**246**	**-**	**816**	**3.3%**	**25,570**