



Australian Government
Australian Reinsurance Pool Corporation

Financial Outlook Report as at 30 June 2023

Cyclone Reinsurance Pool





From the CEO

As CEO of Australian Reinsurance Pool Corporation (ARPC), I am pleased to present the Financial Outlook Report (FOR) for the year ended 30 June 2023. The *Terrorism and Cyclone Insurance Act 2003* (TCI Act) requires ARPC to provide a FOR for the Cyclone Reinsurance Pool (cyclone pool) to the Minister, for the year ending 30 June 2024 onwards by the 15th October and publish the FOR within the following 10 business days. This 2023 FOR is published at the discretion of ARPC for transparency and for the information of stakeholders.

The FOR considers the financial outlook of the cyclone pool, noting that the cyclone pool commenced operations from 1 July 2022, with the first insurers joining on 1 January 2023. The purpose of the FOR is to assess the current and expected future ability of ARPC to meet the legislative obligations of the cyclone pool. This includes an assessment of the adequacy of premium rates and claims liabilities, observations on capital management practices, and on broader risks affecting the cyclone pool's financial outlook. There is a considerable level of uncertainty in projecting the financial outcomes of natural catastrophes, like cyclone events, and this report illustrates that uncertainty.

The FOR, and actions arising from it, are informed by actuarial assessment. The TCI Act also requires that the Reviewing Actuary (currently the Australian Government Actuary) reviews the FOR. The letter from the Reviewing Actuary is included in the appendices of this report.

During this reporting period, four insurers joined the cyclone pool, with five more joining on 1 July 2023. ARPC estimates that 94 per cent of the cyclone pool's projected ultimate exposure will have joined by 31 December 2023. With the remaining large insurers joining the cyclone pool in the second half of the 2023 calendar year, experience is expected to develop significantly over the coming months.



Dr Christopher Wallace | BEc (Hons) PhD (Econ) AMP (INSEAD) ANZIIF (Fellow) CIP GAICD
Chief Executive

Management statement

In our opinion, the attached Financial Outlook Report, for the year ended 30 June 2023, complies with the requirements of the *Terrorism and Cyclone Insurance Act 2003* and is based on appropriate actuarial assessment. Management has put in place suitable processes and systems to prepare the FOR and to support its review by the Reviewing Actuary.



A handwritten signature in black ink, appearing to read 'Scott Unterrheiner'.

Scott Unterrheiner | BCom (Accounting/Finance) GradDip CA
Chief Financial Officer



A handwritten signature in black ink, appearing to read 'Pulkit Jain'.

Pulkit Jain | BCom (Actuarial)/BAppFinance FIAA
Head of Actuarial

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Section 1: Executive Summary

1.1 Introduction

The Cyclone Reinsurance Pool (cyclone pool) was established by the *Terrorism and Cyclone Insurance Act 2003* (TCI Act) and commenced operations from 1 July 2022, with the first insurers joining on 1 January 2023. The cyclone pool covers cyclone and cyclone-related flood damage to insured residential (Home), strata (Strata), and small business (SME) properties. The cyclone pool is designed to improve insurance affordability and availability in areas with medium to high cyclone risk.

This report considers the financial outlook of the cyclone pool, noting that the cyclone pool is still in its infancy.

1.2 Assessment

The financial outlook for the cyclone pool is largely unchanged since its commencement in July 2022. While the cyclone pool currently covers around half of all eligible properties, the premiums ceded to date are consistent with original expectations.

Claims costs from cyclones during the year were very low. Premiums received funded start-up expenses for the year and resulted in a small surplus at 30 June 2023.

The FOR assesses the cyclone pool's current and expected future ability to meet its legislative objectives. This assessment is completed using the criteria and approach outlined in Table 1.1 below, which are aligned to the requirements of the TCI Act and Regulations.

Table 1.1 – Overview of FOR assessment

Category	Key assessment criteria	Approach in this FOR
Adequacy of premiums	<p>Premiums are assessed against the four legislative objectives specified in the TCI Act:</p> <ul style="list-style-type: none"> • Be cost-neutral to the government in the long-term • Target cyclone premium reductions to medium and high-risk areas • Keep premiums for low-risk areas at a level comparable to private market • Incentivise risk mitigation activities to encourage risk reduction 	<p>Given limited claims experience, assessment has relied on:</p> <ul style="list-style-type: none"> • Comparison of premiums to modelled cyclone pool cost¹, estimated using assumptions from the Initial Pricing Review • Comparison of assumptions to external data sources
Adequacy of insurance liabilities	<ul style="list-style-type: none"> • Assessment of previous insurance liabilities compared to actual experience • Assessment of appropriateness of underlying assumptions and approach for setting insurance liabilities 	<ul style="list-style-type: none"> • Assessment of actuarial methodology and application of actuarial standards to insurance liability setting

¹ The modelled cyclone pool cost is equal to the Annual Average Loss (AAL) from cyclone events, plus allowances for eligible insurer claims handling expenses and ARPC's operating expenses. No allowance for investment income has been made due to materiality.

Capital management practices	<ul style="list-style-type: none"> Assessment of adequacy of current and future capital position Assessment of management actions taken or recommended 	<ul style="list-style-type: none"> Projection of capital position Analysis of distribution of outcomes Scenario testing
Risk affecting the cyclone pool's outlook	Assessment of the impact of broader risks on the financial outlook of the cyclone pool	Assessment of the impact of inflation, increase in the number of new buildings, climate change and rates of insurance take-up

1.3 Premium income

Four insurers joined the cyclone pool prior to 30 June 2023, with five more joining on 1 July 2023. Analysis in this report includes exposure data for insurers that joined on 1 July 2023. By 31 December 2023, ARPC estimates that 94 per cent of the cyclone pool's projected ultimate exposure will have joined the cyclone pool.

Gross written premium (GWP) for the financial year ended 30 June 2023 was \$159.9 million, with \$63.1 million earned. Premiums collected by ARPC from insurers are determined by applying the cyclone pool premium formula to eligible insurance policies. Table 1.2 shows average premiums received by Catastrophe Risk Evaluation and Standardising Target Accumulations (CRESTA) region.

Table 1.2 – Average premiums by CRESTA (exposure as at 1 July 2023)¹

CRESTA	Total number of properties	Average cyclone pool premium (\$)		
		Home	Strata	SME
Gold Coast	177,974	217	387	262
Brisbane	704,075	146	258	147
Sunshine Coast	139,399	227	326	203
Rockhampton	43,121	366	529	411
Mackay	41,787	873	1,426	1,791
Townsville	63,547	709	1,689	1,937
Cairns	64,565	535	1,313	1,589
Darwin	30,603	674	899	1,300
Pilbara	9,531	2,381	10,613	4,213
Perth	606,292	117	160	76
Far North Coast NSW	92,167	173	548	207
Other	669,867	112	225	126
Total	2,642,928	190	587	298

Excludes CRESTAs in SA, ACT, VIC, TAS and nil-risk CRESTAs in NSW

Number of properties includes Buildings, Contents or Combined policies

Average premiums assume 'full' coverage, i.e. SME premium = Buildings + Contents + BI

The average premiums reflect the composition of sum insured and property characteristics in each region. The higher average Strata premiums reflect the higher sums insured for Strata properties compared with Home and SME. Average cyclone pool premiums are highest in Pilbara, reflecting the high cyclone risk in this region.



1.4 Premium adequacy

Cyclone activity impacting the cyclone pool has been low, and claims experience is insufficient to inform insights into premium adequacy. Therefore, this report has relied on modelled cost estimates to assess long-term premium adequacy, comparing actual data received from insurers to assumptions from the 2022 Premium Rates (Initial Premium Rates) determined during the 2022 Pricing Review (Initial Pricing Review)².

Objective 1: long-term cost-neutrality

Table 1.3 projects the operating result for the cyclone pool, allowing for the expected timing of insurers joining the cyclone pool, inflation, and new dwelling growth. The projection assumes that the ratio of claims expenses to premiums is approximately 98 per cent, consistent with the Initial Pricing Review.

Table 1.3 – Cyclone pool projected financial performance for the financial years 2024-26

\$000s	FY 2023-24	FY 2024-25	FY 2025-26
Earned premium	737,700	899,000	961,000
Claims expense	(720,700)	(878,000)	(939,000)
Other operating expenses	(21,216)	(22,436)	(23,122)
Underwriting result	(4,216)	(1,436)	(1,122)
Investment income	1,713	1,656	1,612
Operating result	(2,502)	220	490

Over the long-term, operating expenses are expected to be two per cent of premium which will result in a zero underwriting result. However, expenses are budgeted to be higher in the start-up phase of the cyclone pool, leading to a small projected underwriting loss. The projected income is similar to the projected outgoings for the next three years, which is consistent with the cyclone pool's objective of long-term cost-neutrality. Unless there is a significant change in circumstances, no material changes are intended for the overall level of premium rates until more time has elapsed for experience to develop.

If cyclone experience is lower than the modelled average, and the cyclone pool accumulates assets, investment income could materially increase the cyclone pool's operating result. ARPC will consider how investment income from accumulated assets could be used in future to support the cyclone pool in achieving its objectives under the TCI Act.

Objectives 2 and 3: reducing cyclone premiums for medium and high-risk properties, while maintaining premiums at a level comparable to the private market for low-risk properties.

Table 1.4 shows the premium adequacy ratio (cyclone pool reinsurance premium divided by modelled cyclone pool cost) for low to high cyclone risk properties. The modelled cyclone pool cost band is used here as a measure of cyclone risk, with higher risk properties having a higher modelled cyclone pool cost.

² Cyclone Reinsurance Pool – Pool determination applying from 1 October 2022 - <https://arpc.gov.au/wp-content/uploads/2022/10/2022.10.01-Publication-ARPC-Premium-Rate-Assessment-Report-Update-for-Consultation-as-at-1-October-2022-reissued-7-October-2022.pdf>

Table 1.4 – Premium adequacy ratio by modelled cyclone pool cost band (exposure as at 1 July 2023)

Cyclone risk	Modelled cyclone pool cost band	Number of properties (000s)	Average modelled cyclone pool cost (\$)	Average cyclone pool premium (\$)	Premium adequacy ratio
Low to high risk	Less than \$100	1,383.4	52	65	126.4%
	\$100 to \$500	813.8	169	199	117.4%
	\$500 to \$1,000	137.8	597	588	98.5%
	\$1,000 to \$2,000	37.2	1,100	954	86.7%
	\$2,000 to \$5,000	5.7	3,183	1,934	60.8%
	More than \$5,000	4.5	5,147	2,410	46.8%
Total		2,382.4	157	164	104.5%

Excludes nil risk properties

Number of properties includes Buildings, Contents or Combined policies

As intended in the Initial Premium Rates, ARPC is collecting premium for low-risk properties that reflects their modelled cyclone pool cost, plus an allowance for the expected profit margin that would be collected in the private market. The margins collected on low-risk properties are used to fund premium reductions for high-risk properties, resulting in premiums for high-risk properties that are significantly lower than their modelled cyclone pool cost. The cyclone pool does not charge premiums for properties with no cyclone risk.

The relationship between level of risk and premium is consistent with the cyclone pool's legislated objectives. The overall premium adequacy ratio for exposure as at 1 July 2023 is 104.5 per cent and expected to reduce to 100 per cent when all eligible exposure has been ceded to the cyclone pool.

Objective 4: Incentivise risk mitigation activities to encourage risk reduction.

Improving the resilience of insured assets to cyclone losses through risk mitigation reduces claims costs to the cyclone pool while improving the built environment. ARPC's premium rates support this by:

- Incentivising property level mitigation through premium discounts for homeowners who have retrofitted their home to improve resilience. Premium discounts of \$4.9 million (in aggregate) have been applied to cyclone pool premiums to date.
- Reflecting the impact of large-scale mitigation initiatives, such as levees, in the premium formula.
- Recognising the relative levels of risk of different building characteristics in the premium formula.

Premium discounts for property level mitigation are currently offered for Home policies. ARPC will consider how risk mitigation discounts can be extended to Strata and SME and include these in the premium rating structure where appropriate.

ARPC is further promoting risk mitigation through the following:

- **Thought leadership:** ARPC has partnered with the Cyclone Testing Station (CTS) at James Cook University to undertake research relating to cyclone risk mitigation for Strata and SME properties and strategies for making large Strata buildings more resilient to damage from wind-driven rain.
- **Data sharing across government:** The Hazards Insurance Partnership is a government initiative managed by the National Emergency Management Agency (NEMA) to help communities better prepare for disasters. ARPC has engaged with NEMA and the Australian Climate Service to identify areas where ARPC's data assets may be used to better target mitigation investment.



1.5 Claims cost

The modelled Average Annual Loss (AAL) for the exposure over the year to 30 June 2023 is \$61.7 million. The cyclone pool had exposure to two cyclone events during the reporting period, which resulted in an estimated ultimate incurred claims cost of \$110,000 for the year. Therefore, the claims cost for the year was well below modelled and not material to the cyclone pool's financial outlook. The approach to estimating the ultimate incurred claims cost is consistent with standard actuarial practice.

The significant difference between observed experience and the modelled AAL is not unexpected as cyclone losses are volatile and observed losses will not match the modelled mean in a given year. Premiums for the cyclone pool are expected to be cost-neutral to the government over the long-term. Table 1.5 shows the distribution of modelled cyclone losses for the cyclone pool's earned exposure for the 2022-23 financial year.

Table 1.5 – Modelled losses by return period for cyclone pool earned exposure for the 2022-23 financial year

Cyclone pool loss distribution (\$m)		
Average Annual Loss		61.7
Return period	Probability of exceedance	Loss
1 in 1.1 years	87.7%	0.11
1 in 5 years	20.0%	61.7
1 in 10 year	10.0%	145.5
1 in 20 year	5.0%	271.5
1 in 50 year	2.0%	501.0
1 in 100 year	1.0%	895.5
1 in 200 year	0.5%	1,268.7
1 in 1,000 year	0.1%	2,864.9

The AAL of \$61.7 million represents the mean of the distribution of potential losses for the financial year 2022-23. The AAL is heavily influenced by high severity, low probability events. The actual observed claims cost of \$110,000 represents a plausible outcome, with the probability of having a loss less than or equal to this amount being 12 per cent (or one in every eight years).

1.6 Capital management

The primary objective of ARPC's Capital Management Policy is to manage assets so that they are available to meet financial obligations. If assets are insufficient to meet claims liabilities, the cyclone pool is supported by an annually reinstated Commonwealth guarantee which provides additional funding. Due to the high levels of volatility in cyclone activity, the cyclone pool is expected to either accumulate assets, or call on the Commonwealth guarantee, over the short and medium term.

In ARPC's Capital Management Policy, the cyclone pool net assets³ target is set to cover a one in 20-year level of loss, equivalent to a 95 per cent probability of sufficiency. The financial position of the cyclone pool is monitored continuously, and a net assets position outside the target range may result in management action.

ARPC's approach to capital management is appropriate for a portfolio with significant volatility and the backing of a Commonwealth guarantee. It is expected that the cyclone pool will accumulate assets, or be

³ Net assets are defined as assets less liabilities, excluding any repayment obligations for calls made on the Commonwealth guarantee.



in deficit positions, over the medium term and the target range in the Capital Management Policy is consistent with this expectation.

Cyclone activity, and therefore losses for the cyclone pool, was benign over the 2022-23 cyclone season, resulting in the cyclone pool accumulating a small net asset position of \$43.0 million as at 30 June 2023. This is within ARPC's target range, and no management action is anticipated under its Capital Management Policy.

1.7 Risks to financial outlook

This section describes key risks to the cyclone pool's financial outlook that will require monitoring as the cyclone pool matures.

Inflation

Building cost inflation over the 12 months to 31 March 2023 was 11.4⁴ per cent, considerably higher than long-term expectations. Higher material and construction costs drive increases in claims cost to the cyclone pool. To the extent that these higher construction costs are reflected in higher sums insured, premium income will also increase proportionally. Long-term, it is expected that sums insured will reflect the rebuild costs of properties, and therefore the high level of inflation is not expected to impact the adequacy of the premium rates. However, short-term, the sudden increase in building cost inflation is likely to outpace increases in sums insured (and therefore premium charged), resulting in underinsurance. Claims that result in a complete rebuild (or total loss) are limited by the policy sum insured, so underinsurance on total loss claims does not impact premium adequacy. However, for non-total loss claims, underinsurance may lead to a higher ratio of claims cost to premiums, and therefore negatively impact premium adequacy.

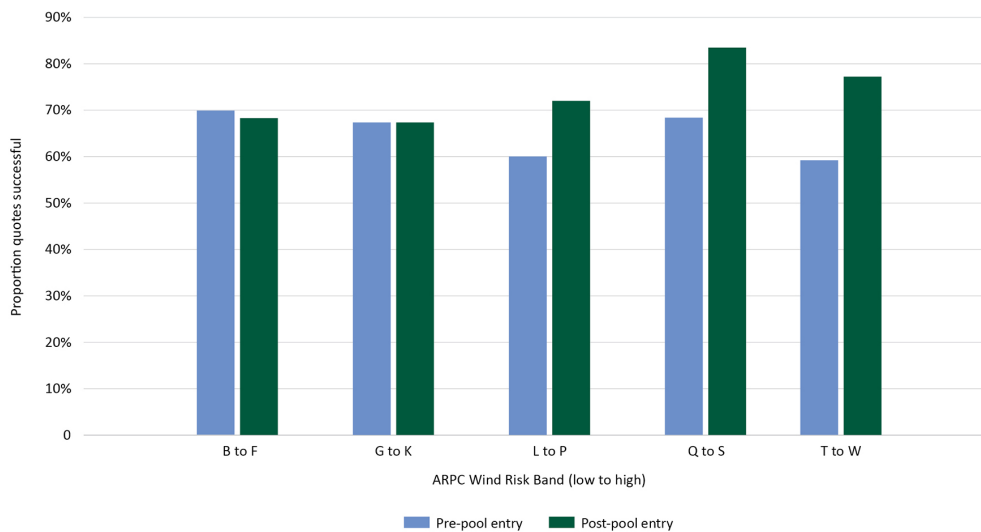
The impact of inflation on the cost-neutrality of the premium rates will be considered by ARPC over the long-term. The cyclone pool does not have to respond to short-term market movements. Management will continue to monitor the inflationary environment and consider action if required in the future.

Insurance take-up

Increasing access to, and improving affordability of, insurance for high-risk properties is an objective of the cyclone pool. Figure 1.1 shows the proportion of successful online quotes from insurers pre- and post-cyclone pool entry. The quotes are grouped by ARPC Wind Risk Band. The ARPC Wind Risk Band is a premium rating band developed by ARPC for the calculation of cyclone pool premiums. Low-risk bands are shown at the left of the graph, and high-risk on the right, with 'W' being the highest risk. A greater proportion of high-risk policies are successfully receiving online quotes since insurers have joined the cyclone pool. This suggests the cyclone pool is improving access to insurance for high-risk properties.

⁴ ABS, Producer Price Indexes, Australia - Input to the house construction industry, Reference period – March quarter 2023

Figure 1.1 – Proportion of successful quotes pre- and post-cyclone pool entry (insurers joined to 1 July 2023)



Source: Quote data provided by Finity Consulting

The Initial Pricing Review allowed for the fact that not all properties take out insurance cover and that non-insurance tends to be biased towards high-risk properties. Lower insurance take-up in high-risk properties reduces the overall premium required to meet long-term cost-neutrality.

While an increase in insurance take-up in high-risk areas indicates that the cyclone pool is meeting its objective, it may also require an increase in premium rates over time to maintain the current risk pooling between low and high-risk properties. Insurance take-up rates will be analysed and monitored as the cyclone pool matures to understand their impact on premium adequacy.

Catastrophic event

Cyclone risk is highly volatile, with the potential for low probability, high severity events to occur in any given year. Once all eligible insurers have joined the cyclone pool, the modelled probability of a \$10 billion loss event is greater than one per cent. If a \$10 billion cyclone event were to occur in the next year, there is an 87 per cent probability that the cyclone pool would require more than 20 years to return to a surplus position (net assets, less any calls made on the Commonwealth guarantee) without management action.

The objective of cost-neutrality over the long-term will need to be balanced with the objective of improving insurance availability and affordability in high-risk regions. It is important to note that “longer term” for cost-neutrality is not defined in the TCI Act because an appropriate time period may depend on the capital position of the cyclone pool.

Climate change

Cyclone risk in Australia is likely to shift due to climate change, including an increase in the proportion of severe events, increasing impacts of cyclone-induced storm surge due to rising sea levels, and the possible poleward migration of cyclone tracks towards more heavily populated areas with lower resilience building codes. Changes to the level and geographical shape of cyclone risk in Australia may materially reduce the effectiveness of the current premium rates in meeting legislative objectives. However, uncertainty around projections is significant.

The catastrophe models used to inform the premium rates reflect the best view of loss exposure for the effective period of current premiums. The premium rates are set to generate revenue sufficient to fund

expected losses over the long-term, while reflecting current climate conditions. This approach to considering climate change impacts on the premium rates is appropriate given information currently available. ARPC will conduct further scenario testing to understand how cyclone and related flood risk may change in the future.

1.8 Actions

Table 1.6 summarises the key actions arising from the report that ARPC intends to take relating to the financial outlook of the cyclone pool. Given the infancy of the cyclone pool, and limited experience available to comment on at this stage, the actions largely focus on areas for further analysis and monitoring. In future years, it is likely the actions arising from the FOR will need to directly address emerging risks to the cyclone pool's financial outlook.

Table 1.6 – Actions

Number	Category	Action	Timeframe	Section
1	Premium rates	Unless there is a significant change in circumstances, no material changes to be made to the overall level of premium rates until more time has elapsed for experience to develop.	12 months	4.2
2	Investment income	Consider how investment income on accumulated assets could be used to support the cyclone pool in achieving its objectives under the TCI Act.	12-24 months	4.2
3	Inflation	The impact of the high levels of building cost inflation on premium adequacy to be considered over the long-term. Management to monitor the inflationary environment and consider action if required in the future.	12 months	5.1
4	Climate change	Undertake future climate change scenario testing to better understand the potential quantitative impacts of climate change on the cyclone pool under a range of projected warming scenarios.	12-24 months	5.2
5	Premium rates	Review the risk pooling in the premium rates to confirm these are still appropriate for the exposure once most insurers have joined.	12-24 months	6.1
6	Insurance take-up rates	Insurance take-up rates to be analysed and monitored as the cyclone pool matures to understand the impact on premium adequacy and the impact the cyclone pool is having on insurance availability.	12-24 months	6.2
7	Unknown data	Incentivise insurers to collect additional risk data to increase premium accuracy for policyholders by considering introducing penalty premium rates for unknown rating data.	24-36 months	6.2
8	Risk mitigation	Consider how risk mitigation discounts (that currently exist for Home) can be extended to SME and Strata and include in the premium rating structure where appropriate.	12-24 months	6.4

Section 2: Background

2.1 Legislation

ARPC is a public financial corporation, originally established under the *Terrorism Insurance Act 2003* on 1 July 2003 to administer the Terrorism Reinsurance Pool (terrorism pool).

The *Treasury Laws Amendment (Cyclone and Flood Damage Reinsurance Pool) Act 2022* was assented on 31 March 2022, amending the (renamed) *Terrorism and Cyclone Insurance Act 2003* (TCI Act).

The TCI Act established a Cyclone and Cyclone Related Flooding Reinsurance Pool (cyclone pool) to be administered by ARPC. The cyclone pool covers cyclone and related flood damage to insured Home, Strata, and SME properties and is designed to improve insurance affordability and availability for areas with high cyclone risk. The cyclone pool commenced operations on 1 July 2022, with transitional timeframes for insurers to join. Large insurers are required to join the cyclone pool by 31 December 2023 with all remaining eligible insurers required to fully participate in the cyclone pool by 31 December 2024.

2.2 Design

The cyclone pool offers reinsurance to insurers who insure buildings, contents, and consequential losses for Home, Strata, and SME properties. The cyclone pool is funded by reinsurance premiums paid by insurers to ARPC. In the event of a declared cyclone event, the insurer will recover all eligible claims costs from the cyclone pool.

The cyclone pool can deliver reinsurance at a lower cost than the private market by leveraging a \$10 billion annually reinstated Commonwealth guarantee. The cyclone pool does not price for profit margins or capital holding fees.

2.3 This report

Section 40A of the TCI Act requires ARPC to prepare and provide the Financial Outlook Report (FOR) for the cyclone pool to the responsible Minister. The first FOR is required after the end of the 2023-24 financial year (as at 30 June 2024), and then annually thereafter. From 2024, the FOR must be given to the Minister on or before 15 October and published on the ARPC website within the following 10 business days.

This FOR is prepared as at 30 June 2023 and is published at the discretion of ARPC for transparency and for the information of stakeholders. The cyclone pool is still in its infancy and has been operational since 1 July 2022, with the first insurers joining on 1 January 2023. There is currently limited experience available to assess the financial performance of the cyclone pool. With the remaining large insurers joining the cyclone pool in the second half of the 2023 calendar year, experience will develop materially over the coming year. Analysis in this report relating to the reporting period uses data to 30 June 2023, while analysis of current exposure uses data to 1 July 2023. Data relied upon is described in Appendix A.

ARPC has asked the Reviewing Actuary (currently the Australian Government Actuary) to review the FOR as though it was produced under the TCI Act. The Reviewing Actuary concurs with the actions set out in the FOR. The letter from the Reviewing Actuary is included in Appendix D.

2.4 Uncertainty and reliance

The data available to ARPC as at 1 July 2023 represents approximately 43 per cent of total eligible cyclone pool exposure. There is a risk that this exposure sample may be biased, and insights drawn may not be appropriate for the full cyclone pool exposure.

For SME and Strata properties, the data volumes available to ARPC are significantly lower. Therefore, insights into how these segments are developing against expectations have a higher level of uncertainty.



SME and Strata portfolios are also typically less granular in their approach to natural perils pricing compared to Home portfolios which adds additional uncertainty around the impact of the cyclone pool on policyholder outcomes for these segments.

As a low frequency, high severity peril, the modelling of cyclone losses is subject to significant model and parameter error. The most extreme events, which have not been observed in our recorded history, but are known to be in the distribution of potential outcomes, drive estimated losses from cyclone. ARPC does not have claims data available currently to calibrate the modelling of these events. As such, any analysis drawn from the outputs from these models is subject to material uncertainty.

The analysis underlying this report relies on the accuracy, reliability, and completeness of data submitted to ARPC by insurers. ARPC has data validation processes that promote data accuracy but is ultimately reliant on the data extracted from insurer systems. Appendix A provides further information on the data relied upon for this report.



Section 3: Experience during the financial year

3.1 Financial performance

3.1.1 Summary of operating performance

Table 3.1 – Summary of operating performance for the financial year 2022-23

FY 2022-23 (\$000s)	
Premium revenue	
Written premium	159,871
Earned premium	63,118
Claims expense	
Claims paid	(11)
Case estimates	(31)
Claims reported	(42)
IBNR	(37)
Risk margin	(31)
Total Claims Liability	(110)
Operating expenses	(12,122)
Investment income	487
Finance charges	(3)
Operating result	51,370

Premium revenue

The cyclone pool has written \$159.9 million and earned \$63.1 million of premium, with three insurers ceding premium to the cyclone pool during the year.

Premium is earned in line with the seasonality of cyclone losses from November to April, therefore less than half of the premium written to date has been earned.

Claims expense

There have been four Declared Cyclone Events (DCE) in this reporting period, which are discussed in Section 3.3. Two of these events occurred prior to insurers joining the cyclone pool. The other two events, Tropical Cyclone (TC) Gabrielle and TC Ilsa, have a total claims cost to the cyclone pool of \$110,000.

The claims cost compares to a modelled AAL of \$61.7 million. The significant difference between observed experience and modelled AAL is not unexpected as cyclone losses are volatile and observed losses will not match the modelled mean in a given year. The premiums for the cyclone pool are expected to be cost-neutral to the government only in the long-term.

Table 3.2 shows the modelled loss distribution for the earned exposure.



Table 3.2 – Losses by return period for cyclone pool earned exposure for the 2022-23 financial year

Cyclone pool loss distribution (\$m)		
Average Annual Loss		61.7
Return period	Probability of exceedance	Loss
1 in 1.1 years	87.7%	0.11
1 in 5 years	20.0%	61.7
1 in 10 year	10.0%	145.5
1 in 20 year	5.0%	271.5
1 in 50 year	2.0%	501.0
1 in 100 year	1.0%	895.5
1 in 200 year	0.5%	1,268.7
1 in 1,000 year	0.1%	2,864.9

The AAL of \$61.7 million represents the mean of the distribution of potential losses for the exposure earned to 30 June 2023. The AAL is heavily influenced by high severity, low probability events. There is a one per cent modelled probability of incurring a loss greater than \$895.5 million. The actual observed claims cost of \$110,000 represents a plausible outcome in the modelling, with the probability of having a loss less than or equal to this amount being 12 per cent (or one in every eight years).

Operating expenses

Expenses incurred by ARPC over the 2022-23 financial year were \$12.1 million. These expenses reflect the costs involved with the establishment of the cyclone pool, including building internal capability and technology solutions to meet the increased resourcing needs of the corporation. The Initial Premium Rates allow for ARPC's operational expense to be two per cent of premiums.

Operating result

Overall, the cyclone pool had a net operating result of \$51.4 million, reflecting the lower-than-expected cyclone losses over the year.



3.1.2 Summary of financial position

Table 3.3 – Summary of financial position for the financial year 2022-23 from ARPC’s management accounts

\$000s as at 30 June 2023	
Assets	
Cash and cash equivalents	996
Trade and other receivables	78,637
Investments	59,600
Deferred insurance assets	2,136
Non-financial assets	446
Total assets	141,815
Liabilities	
Unearned premium	96,754
Outstanding claims	99
Payables and other liabilities	1,954
Total liabilities	98,807
Net assets	43,008

The cyclone pool has unearned premium of \$96.8 million as at 30 June 2023. Additionally, there is a liability for outstanding claims of \$99,000, \$68,000 of which comprises an allowance for Incurred But Not Reported (IBNR) claims and a risk margin. The cyclone pool holds \$1.0 million in cash to meet operating expenses as they fall due and \$59.6 million in term deposits. Given that insurers pay premiums quarterly, and in arrears, written premium for the quarter ending 30 June 2023 was estimated and accrued; the cyclone pool has trade and other receivables of \$78.6 million. Net assets are \$43.0 million.

The cyclone pool has built up a small amount of net assets at the end of its first year of operations due to lower-than-average cyclone activity to date.

3.2 Revenue and coverage

3.2.1 Participating insurers

The TCI Act, together with its supporting Regulations, requires any insurer with gross written premium (GWP) exceeding \$10 million (for policies eligible for the cyclone pool in cyclone impacted regions) to join the cyclone pool. The TCI Act sets out two deadlines for joining:

- Large Australian general insurers, defined as those with more than \$300 million GWP for household insurance for the last financial year before 31 December 2022, must transfer all eligible risks to the cyclone pool by 31 December 2023.
- All other insurers required to join the cyclone pool must transfer all eligible risks by 31 December 2024.

As at the time of writing this report, all large insurers have either joined, or communicated their plans to join, the cyclone pool.



Table 3.4 – Insurers joined or joining the cyclone pool to 31 December 2023

Insurer	Join date
<i>Joined in reporting period</i>	
Allianz Australia Insurance Limited	1-Jan-23
Sure Insurance (underwritten by Liberty Mutual Insurance Company and Pacific International Insurance Pty Limited)	1-Jan-23
QBE Insurance (Australia) Limited	20-Jun-23
AAI Limited (Suncorp)	30-Jun-23
<i>Joined after reporting period (exposure included)</i>	
The Hollard Insurance Company Pty Ltd	1-Jul-23
RAA Insurance Limited	1-Jul-23
RAC Insurance Pty Limited	1-Jul-23
RACQ Insurance Limited	1-Jul-23
Youi Pty Ltd	1-Jul-23
<i>To join before 31 December 2023</i>	
Auto & General Insurance Company Limited	
Insurance Australia Limited (IAG)	
Total number of 'large' insurers	11

Note: Not all insurers have transferred all eligible exposure to the cyclone pool as at the joining date. Some insurers are staggering the transfer of risk through the 2023 calendar year. One large insurer had joined, but not transferred any risks to the cyclone pool as at 1 July 2023.

As at 1 July 2023, as a proportion of the sum insured that will ultimately be covered, the cyclone pool reinsures 47 per cent of the Home exposure, 17 per cent of Strata, and 17 per cent of SME⁵. ARPC estimates that insurers joining before the end of the 2023 calendar year will represent approximately 94 per cent of the ultimate cyclone pool exposure.

As at 1 July 2023, the cyclone pool reinsures 43 per cent of the sum insured that will ultimately be covered, with an estimated 94 per cent of the ultimate cyclone pool exposure expected to be covered by the end of 2023.

⁵ These estimates are based on total sum insured, as a proportion of the total eligible sum insured estimated in the Initial Pricing Review.

3.2.2 Coverage and premiums

Table 3.5 – Cyclone pool exposure, and total premium by CRESTA region and class of business (as at 1 July 2023)

	Rest of QLD and Northern NSW	Northern QLD	NT	Northern WA	Southern WA	Total
Home						
Number of properties	1,663,224	133,583	42,261	26,921	682,003	2,547,992
Buildings sum insured (\$m)	695,775	52,211	19,610	11,514	297,023	1,076,133
Contents sum insured (\$m)	127,928	6,711	2,587	1,533	56,114	194,874
Total cyclone pool premium (\$000s)	204,935	64,244	14,307	23,592	65,019	372,097
Strata						
Number of properties	16,204	3,338	183	182	2,626	22,533
Buildings sum insured (\$m)	18,565	5,229	279	485	3,295	27,853
Total cyclone pool premium (\$000s)	6,331	4,942	120	1,430	418	13,241
SME						
Number of properties	52,749	3,789	667	562	14,636	72,403
Buildings sum insured (\$m)	8,001	903	102	148	1,684	10,838
Contents sum insured (\$m)	6,845	420	104	60	2,021	9,450
Business interruption sum insured (\$m)	7,136	485	105	64	1,893	9,683
Total cyclone pool premium (\$000s)	2,783	1,603	103	419	248	5,156
Total						
Number of properties	1,732,177	140,710	43,111	27,665	699,265	2,642,928
Sum insured (\$m)	864,250	65,960	22,787	13,804	362,030	1,328,831
Total cyclone pool premium (\$000s)	214,049	70,789	14,531	25,441	65,685	390,494

*Excludes CRESTAs in SA, ACT, VIC, TAS and nil-risk CRESTAs in NSW
Number of properties includes Buildings, Contents or Combined policies*

As at 1 July 2023, the cyclone pool reinsures 2.6 million Home properties, 23,000 Strata properties, and 71,000 SME properties. The sum insured for the cyclone pool totals \$1,328.8 billion.

The total premium of \$390.5 million represents the annualised cyclone pool premium for the properties reinsured as at 1 July 2023. This is higher than the written premium shown in Table 3.1 as the written premium relates to the reporting period ending 30 June 2023 and only covers the portion of the annual premium that relates to the remaining time on risk for policies as at the date of transfer.

Table 3.6 shows average premiums by CRESTA region.



Table 3.6 – Average premiums by CRESTA (exposure as at 1 July 2023)

CRESTA	Total number of properties	Average cyclone pool premium (\$)		
		Home	Strata	SME
Gold Coast	177,974	217	387	262
Brisbane	704,075	146	258	147
Sunshine Coast	139,399	227	326	203
Rockhampton	43,121	366	529	411
Mackay	41,787	873	1,426	1,791
Townsville	63,547	709	1,689	1,937
Cairns	64,565	535	1,313	1,589
Darwin	30,603	674	899	1,300
Pilbara	9,531	2,381	10,613	4,213
Perth	606,292	117	160	76
Far North Coast NSW	92,167	173	548	207
Other	669,867	112	225	126
Total	2,642,928	190	587	298

Excludes CRESTAs in SA, ACT, VIC, TAS and nil-risk CRESTAs in NSW

Number of properties includes Buildings, Contents or Combined policies

Average premiums assume 'full' coverage, i.e. SME premium = Buildings + Contents + BI

Premiums collected by ARPC from insurers are determined by applying the cyclone pool premium formula to eligible insurance policies. The average premiums therefore reflect the composition of sum insured and property characteristics in each region.

The higher average Strata premiums reflect the higher sums insured for Strata properties compared with Home and SME. Average cyclone pool premiums are highest in Pilbara, reflecting the high cyclone risk in this region.

3.3 Reinsured cyclones

The cyclone pool provides cover for eligible cyclone losses within the event period defined in the TCI Act. The period commences when ARPC declares a DCE, based on notification from the Bureau of Meteorology (BoM), of an eligible cyclone event. The coverage window extends to the time that ARPC declares the end of the cyclone, plus 48 hours.

Since commencing operations, ARPC has declared four cyclones. Two of these events, TC Darian, and TC Ellie, had coverage periods that ended in December 2022, predating the first insurers joining the cyclone pool. Therefore, there were no eligible cyclone losses for these two events. This section summarises the two events impacting exposed cyclone pool properties.

3.3.1 TC Gabrielle

TC Gabrielle formed from a tropical low that developed near the Solomon Islands and was classified as a cyclone by the BoM on Thursday, 9 February 2023 at 11am Australian Eastern Standard Time (AEST). After tracking towards the Queensland coastline, the system steered east towards Norfolk Island. TC Gabrielle passed Norfolk Island during the night of Saturday, 11 February 2023 as a Category 2 cyclone and was soon after reclassified as a subtropical low. The weather system continued to New Zealand, where it caused around NZD \$2 billion of insured losses⁶. At the time that TC Gabrielle passed Norfolk Island, wind gusts are estimated to have been approximately 90 kilometres per hour, or 25 metres per second. Residents on

⁶ NZD 2,018m – PERILS releases detailed industry loss footprint for Cyclone Gabrielle. <https://www.perils.org/files/News/2023/Loss-Announcements/Cyclone-Gabrielle/2023-08-17-PERILS-Press-Release-Cyclone-Gabrielle-11-17-Feb-2023.pdf>

Norfolk Island were well-prepared for the event and had implemented mitigation strategies. Table 3.7 shows the cyclone pool's exposure to and costs from the event, which were minimal.

Table 3.7 – TC Gabrielle exposure and costs

TC Gabrielle	
Coverage	
Start	9 Feb 2023 11am
End	14 Feb 2023 3am
Claims	
Number of claims reported	4
Claims paid (\$)	11,000
Insurer case estimates (\$)	31,000
Average claim size (\$)	10,500
IBNR (\$)	9,000
Risk margin (\$)	5,000
Total incurred cost	56,000

Figure 3.1 – TC Gabrielle track and cyclone pool exposure

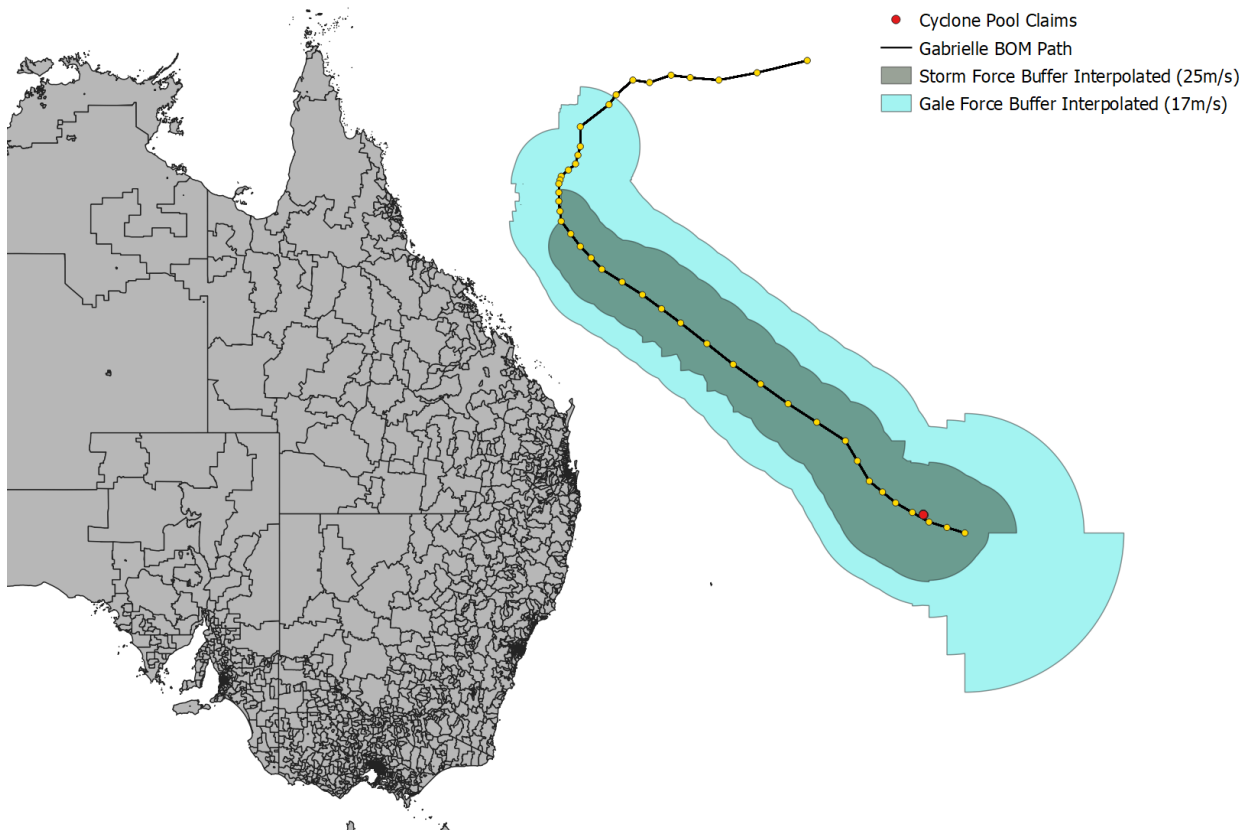


Figure 3.1 shows the track of TC Gabrielle, ARPC's estimated impact zones and the claims reported to date.

3.3.2 TC Ilsa

TC Ilsa formed off the coast of Western Australia (WA) and was observed by the BoM on Tuesday, 11 April 2023 at 5.30pm. TC Ilsa crossed the coastline of WA between De Grey and Wallal Downs just before midnight on Thursday, 13 April 2023. At its peak, wind speeds of 297 kilometres per hour were recorded, however, the system moved quickly across land and was downgraded to a category 1 within 14 hours of crossing the coastline. ARPC declared the end of the cyclone at 7pm on Friday, 14 April 2023.

The area impacted is sparsely populated and has limited exposure for the cyclone pool. The closest population centre to the event track was Port Hedland (approximately 100 kilometres from the crossing point). The cyclone pool has exposure in Port Hedland, where the event caused limited damage, as the community is well-prepared for cyclone events and the building stock in the area constructed after 1980 is of a high standard in line with the building code. The cyclone pool had received no claim notifications from TC Ilsa as at 30 June 2023⁷, and is holding an IBNR allowance of \$28,000 for this event.

Table 3.8 – TC Ilsa exposure and costs

TC Ilsa	
Coverage	
Start	11 April 2023 5.30pm
End	16 April 2023 7pm
Claims	
Number of claims reported	0
Claims paid (\$)	0
Insurer case estimates (\$)	0
Average claim size (\$)	0
IBNR (\$)	28,000
Risk margin (\$)	26,000
Total incurred cost	54,000

⁷ One claim has been reported to the cyclone pool for TC Ilsa since 30 June 2023.



Figure 3.2 – TC Ilsa track and cyclone pool exposure as at time of event

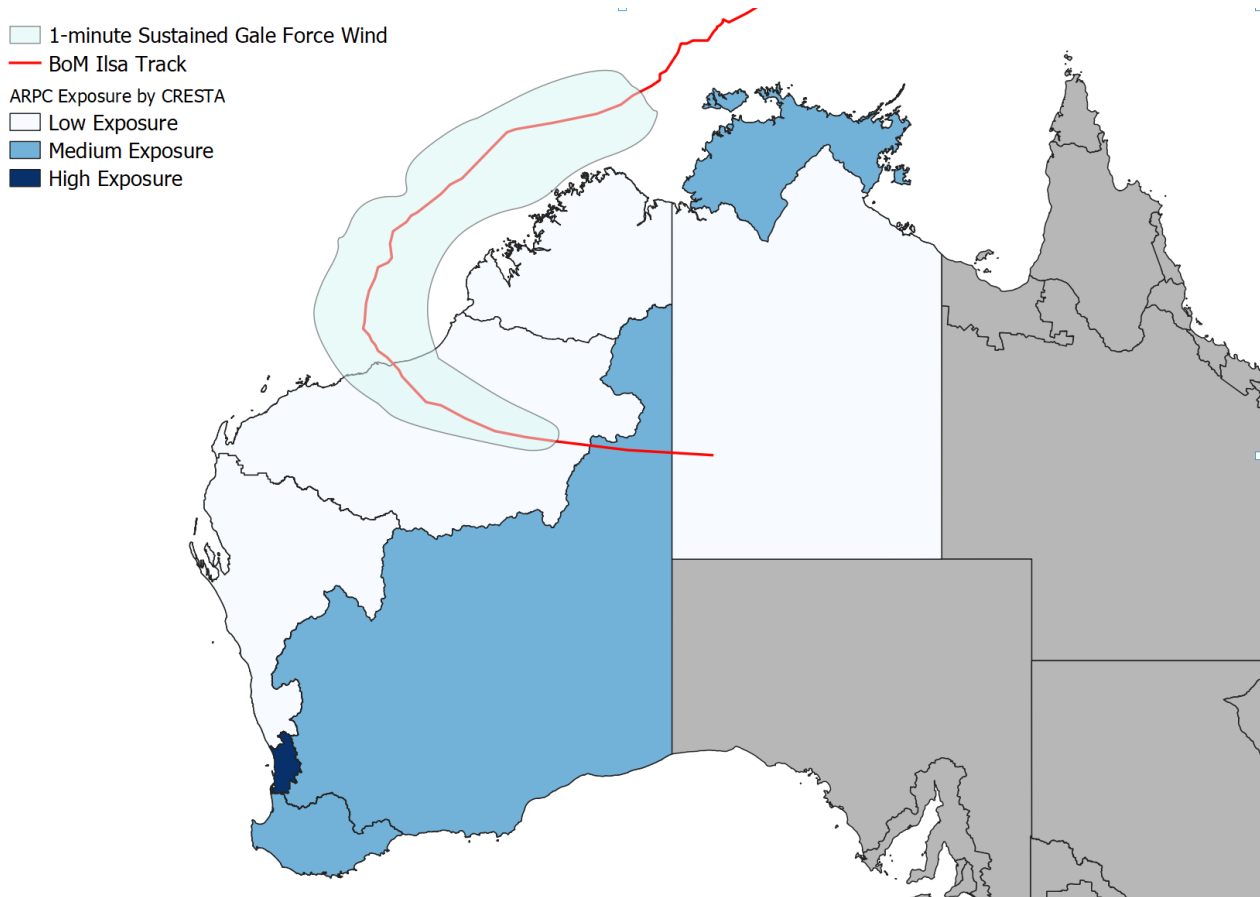


Figure 3.2 shows the track of TC Ilsa, and ARPC’s estimated wind impact zones and associated exposure (WA and Northern Territory (NT) only). The shaded regions represent the volume of properties reinsured by the cyclone pool across CRESTA zones in WA and NT at the time of the event.

3.3.3 Claims liabilities

Total claims liabilities held at 30 June 2023 for TC Gabrielle and TC Ilsa are \$99,000. These liabilities are consistent with the minimal exposure the cyclone pool had to these events and the low volume of claim notifications to date. The methodology used to estimate the liabilities is discussed in Section 7. The approach to estimating these liabilities is consistent with standard actuarial practice.

Claims cost from Declared Cyclone Events has been minimal, reflecting low exposure to these events.

Section 4: Projected financial outcomes

4.1 Projections for the year 2023-24

The approach for projecting cyclone pool premium and claims costs is described in Appendix B. Earned premium for the financial year 2023-24 is projected to be \$737.7 million. The projection assumes that the ratio of claims cost to earned premium is approximately 98 per cent (derived from the Initial Pricing Review). The expected claims cost is therefore estimated to be \$720.7 million.

The claims cost estimate represents the mean of the distribution of possible outcomes. Given the volatile nature of cyclone loss experience, the losses are highly uncertain with a large range of potential outcomes. Actual experience will deviate from this estimate and will likely result in material operating surpluses or deficits in any given year. Table 4.1 shows the distribution of losses for financial year 2023-24, with a 1 per cent modelled probability of incurring a loss greater than \$11.5 billion.

Table 4.1 – Projected modelled losses for FY 2023-24

Cyclone Pool Loss Distribution (\$m)		
Average Annual Loss		720.7
Return Period	Probability of Exceedance	Loss
1 in 5 years	20.0%	720.7
1 in 10 year	10.0%	1,469.1
1 in 20 year	5.0%	2,711.2
1 in 50 year	2.0%	6,359.1
1 in 100 year	1.0%	11,476.8
1 in 200 year	0.5%	16,913.5
1 in 1,000 year	0.1%	37,825.9

The average annual loss for the estimated cyclone pool exposure for financial year 2023-24 is \$720.7 million. The distribution of potential losses is highly skewed, with an 80 per cent modelled probability of a loss less than \$720.7 million and a 1 per cent modelled probability of a loss greater than \$11.5 billion.

4.2 Projections for 2024-2026

Table 4.2 – Cyclone pool projected financial performance for the financial years 2024-26

\$000s	FY 2023-24	FY 2024-25	FY 2025-26
Earned premium	737,700	899,000	961,000
Claims expense	(720,700)	(878,000)	(939,000)
Other operating expenses	(21,216)	(22,436)	(23,122)
Underwriting result	(4,216)	(1,436)	(1,122)
Investment income	1,713	1,656	1,612
Operating result	(2,502)	220	490

Earned premiums are projected to exceed \$730 million for the 2023-24 financial year. Over the long-term, operating expenses have been projected as two per cent of premium but are expected to be slightly higher in the start-up phase, leading to a small projected underwriting loss. As the cyclone pool's operations



mature and earned premiums grow, it is expected that the expenses as a percentage of premium will reduce. Investment income is estimated as 4.5 per cent of average net assets. The operating result of the cyclone pool for the financial year 2023-24 is projected to be a small loss of \$2.5 million.

The projected income is similar to the projected outgoings for the next three years, which is consistent with the cyclone pool's objective of long-term cost-neutrality.

Action 1: Unless there is a significant change in circumstance, no material changes to be made to the overall level of premium rates until more time has elapsed for experience to develop.

If cyclone experience is lower than modelled, and the cyclone pool accumulates assets, investment income could materially increase the cyclone pool's operating result.

Action 2: Consider how investment income from accumulated assets could be used in the future to support the cyclone pool in achieving its objectives under the TCI Act.

The cyclone pool is projected to make a small underwriting loss over the next three years, due to a higher expense ratio in the start-up phase. Investment income results in the projected operating result being positive from financial year 2024-25. Actual experience will deviate from these projections due to the volatility of cyclone activity.



Section 5: Observations on broader risks

5.1 Inflation

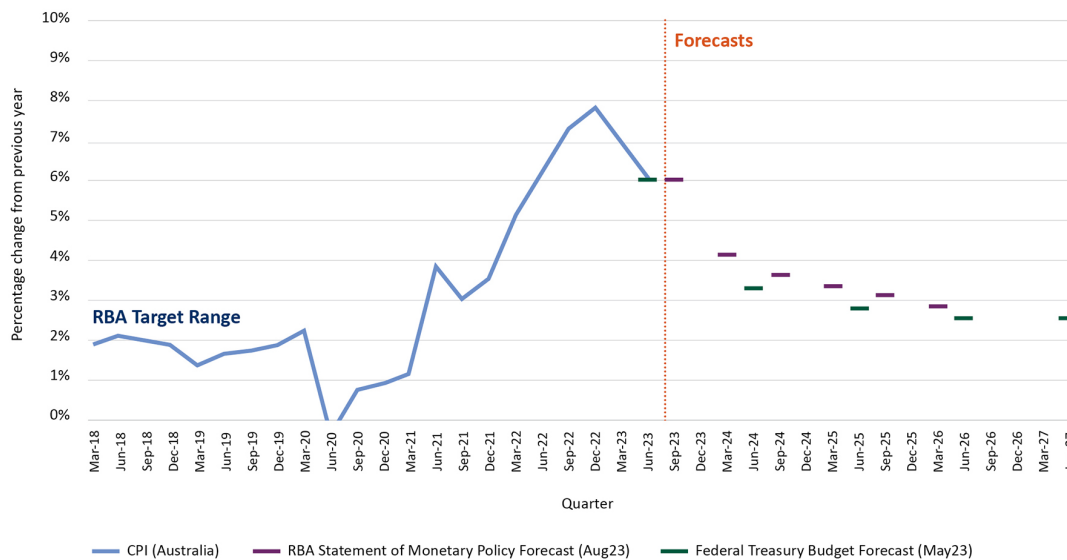
5.1.1 Consumer Price Index

Annual Consumer Price Index (CPI) inflation was six per cent in the June 2023 quarter, down from a 30 year high of 7.8 per cent in the December 2022 quarter, as shown in Figure 5.1.⁸

In his speech on 18 May 2023, Dr Steven Kennedy outlined the following key points related to the inflationary environment⁹:

- The return of high inflation at the fastest rate in 30 years is one of the defining features of the current economic landscape.
- The peak in headline inflation has passed in most countries. This reflects both an improvement in supply and a reduction in demand.
- Supply chains have largely recovered from disruptions related to the pandemic.
- Treasury expects inflation to continue moderating and return to the inflation band by 2024-25.

Figure 5.1 – Historical and projected CPI



Source: Australian Bureau of Statistics Consumer Price Index (June 2023), RBA Statement of Monetary Policy Forecast (August 2023), Federal Treasury Budget Forecast (May 2023)

Cost of living pressures may increase levels of underinsurance as policyholders reduce the level of insurance purchased to manage expenditure. This is commonly done by understating sums insured. Affordability pressures can also lead to lower levels of insurance take-up, particularly where insurance premiums are high. The impact of insurance take-up on the adequacy of the cyclone pool premium rates is discussed in Section 6.2.

⁸ Australian Bureau of Statistics (ABS), Consumer Price Index, Australia

⁹ Dr Steven Kennedy PSM, Secretary to the Treasury, Post-Budget economic briefing, Address to the Australian Business Economists, 18 May 2023.

5.1.2 House construction prices inflation¹⁰

House construction price inflation impacts the cost of building and repairing homes. Inflation in building costs is expected to increase Home building sums insured and increase the cost of claims. Over the past 12 months (up to the March quarter 2023), input prices to house construction rose 11.4 per cent¹¹. Input prices to house construction increased 1.6 per cent in the March 2023 quarter due to labour shortages and price rises in plasterboard, aluminium, glass, and copper materials, primarily driven by high energy and transport costs.

The rate of price increases has eased in recent quarters, following the historically high increases throughout 2022, as the supply of building materials improved due to increased domestic production and imports to meet demand. However, demand for materials remains high due to the volume of work already in the pipeline.

The recent high levels of inflation will directly increase the cyclone pool's claims costs.

5.1.3 Impact of inflation on premium rates

Policyholder sums insured are typically intended to reflect the rebuild cost of a property. The cyclone pool premium formula is expressed as a rate per sum insured. Therefore, to the extent that sums insured increase in line with inflation and continue to reflect the rebuild cost of a property, the higher claims costs to the cyclone pool will be offset by higher premium income. Therefore, over the long-term, it is not expected that the current high levels of inflation will impact the adequacy of the premium rates.

However, over the short-term, the sudden high rate of building cost inflation observed in the Australian economy is likely to outpace increases in sums insured, leading to underinsurance. This occurs for a number of reasons, such as delay in actual inflation levels being recognised, or policyholders moderating premium increases by limiting increases to sums insured. Cost of living pressures may also increase levels of underinsurance as policyholders reduce the level of insurance purchased to manage expenditures.

Claims that result in a complete rebuild (or total loss) are limited by the amount of the policy sum insured, so underinsurance on total loss claims does not impact premium adequacy. However, for non-total loss claims, underinsurance may lead to a higher ratio of claims cost to premiums, and therefore negatively impact premium adequacy.

Action 3:

Consider the impact of high levels of building cost inflation on premium adequacy over the long-term. Management to monitor the inflationary environment and consider action if required in the future.

The recent high levels of building cost inflation may impact the adequacy of premiums over the short-term. Over the long-term, the higher costs are expected to be reflected in higher sums insured and therefore not expected to impact premium adequacy.

¹⁰ ABS, Producer Price Indexes, Australia - Input to the house construction industry, Reference period – March quarter 2023

¹¹ As above.

5.2 Climate change

5.2.1 Summary of the science relevant to Australian cyclone risk

Factors influencing tropical cyclones include ocean temperature, stability and moisture content of mid-troposphere, humidity, sea surface temperature (SST), structure of atmospheric temperature changes, and wind gradient¹². All of these may be affected by climate change.

Warmer sea surface temperature intensifies wind speeds and brings more precipitation. Warmer seas are also extending poleward, providing warm water to maintain tropical cyclone intensity at higher latitudes (southward in Australia). Sea level rise exacerbates the impact of coastal storms and increases the risk of coastal flooding. Changes in the atmosphere contribute to slower-moving cyclones that bring prolonged periods of heavy rainfall, strong winds, and storm surge.

Table 5.1 summarises key drivers of tropical cyclone activity as described in recent scientific studies, including the Intergovernmental Panel on Climate Change (IPCC) 6th Assessment Report¹³. These studies describe complex atmospheric processes which are challenging to model and project into the future. Thus, any projections of how tropical cyclone activity may change in coming decades is subject to significant uncertainty and varying levels of confidence.

Several factors may have significant impacts on potential losses, three of which are noteworthy:

- Poleward migration:** This describes a movement in storm tracks towards the poles, which in Australia is south. This may occur in response to warming of oceans, a key factor in maintaining the intensity of tropical cyclones. While there is significant scientific uncertainty about this in Australia, and low to medium confidence it may occur, if it does, there could be a significant impact on the cyclone pool. This is due to the large concentrations of risk exposure on the east and west coasts which are not currently subject to the strongest cyclone building standards.
- Lower frequency but a higher proportion of severe storms:** The interaction of frequency and severity is complicated. For expected losses for the cyclone pool, most damage arises from severe events. The changes to frequency and severity detailed in Table 5.1 are likely to increase the volatility of experience, while overall loss levels may gradually increase.
- Rising sea levels and coastal inundation:** There is broad consensus that higher sea levels, thermal expansion of warmer waters, and stronger storms will increase storm surge risk. While coverage is currently limited for this peril in the insurance market, if insurers react to the availability of cyclone pool reinsurance, or if consumers react by building more structures on the coast, the cyclone pool's exposure to loss may increase.

¹² Patricola, C.M., Wehner M. (2018) Anthropogenic influences on major tropical cyclone events. *Nature*; 563, 339-346.

¹³ Intergovernmental Panel on Climate Change – Climate Change 2021: The Physical Science Basis - https://report.ipcc.ch/ar6/wg1/IPCC_AR6_WGI_FullReport.pdf



Table 5.1 – Summary of climate drivers affecting tropical cyclones in the Australian region

Driver	Impact	Confidence level	Possible consequence for the cyclone pool
Changes in the expected frequency and severity of events	Overall frequency is expected to decline	Medium ¹⁷	Fewer events and higher volatility of results; may partially offset factors leading to higher losses
	The proportion of storms with high intensity is expected to increase. Overall number of high intensity storms expected to stay stable or slightly increase.	Medium ¹⁷	Potential to increase overall losses as high intensity storms cause majority of damage
Climate cycles	Strong ENSO ¹⁴ events occur more often	Medium ¹⁵	Increased volatility of results
Changes in the characteristics of events	Strong winds are expected to become more likely	Medium ¹⁶	Increased severity of losses
	Extreme rainfall is expected to increase	Medium ¹⁷ to High ¹⁸	Increased severity of flood losses
	The forward speed of events may decrease, leaving wind or rain over an area for longer periods	Medium ¹⁹	Increased duration of rain events at a location, which could affect both pluvial (flash) and fluvial (riverine) flooding
Changes in exposure to storm surge	Sea levels are rising	High ²⁰	Increased exposure to storm surge and coastal inundation
	Enhanced warming of ocean around Australian coast	High ²⁰	Increased exposure to storm surge and coastal inundation
	Higher intensity events	High ²⁰	Increased exposure to storm surge and coastal inundation

¹⁴ Refers to the El Niño Southern Oscillation, which is the oscillation between El Niño and La Niña conditions. El Niño conditions result from the extensive warming of the Pacific Ocean leading to a major shift in weather patterns.

¹⁵ Cai, W. et al. (2023). Anthropogenic impacts on twentieth-century ENSO variability changes. *Nature Reviews Earth and Environment* 4, 407-418. <https://doi.org/10.1038/s43017-023-00427-8>

¹⁶ Australian Climate Service (2023). Tropical Cyclones.

¹⁷ IPCC (2023). Regional fact sheet – Australia. Working Group I – The Physical Science Basis. Sixth Assessment Report.

¹⁸ IPCC (2023). Synthesis Report of the IPCC Sixth Assessment Report (AR6). Longer Report.

¹⁹ Kossin, J.P. (2018). A global slowdown of tropical-cyclone translation speed. *Nature*, 558.

²⁰ Bruyere, C.L. et al. (2022). Using large climate model ensembles to assess historical and future tropical cyclone activity along the Australian east coast. *Weather and Climate Extremes*; 38. <https://doi.org/10.1016/j.wace.2022.100507>

Changes in the location of events	There are indications in the scientific literature that tropical cyclones are moving poleward (south in Australia), though there is uncertainty around this	Low to medium ²¹	Potential for impact on the cyclone pool due to large exposure concentrations south of current high-risk areas which do not currently have the strongest wind building standards
	The size of storms may increase	Low to medium ²²	Larger areas affected in an event

Quantifying the range of potential impacts will allow for better understanding and evaluation of the risk of climate change on the financial outlook of the cyclone pool.

Action 4:	Undertake future climate change scenario testing to better understand the potential quantitative impacts of climate change on the cyclone pool under a range of projected warming scenarios.
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5.2.2 Climate risk in the premium rates

The catastrophe models used to inform the premium rates reflect the best view of loss exposure for the effective period of current premiums. The premium rates are set to generate revenue sufficient to fund expected losses over the long-term, while reflecting current climate conditions.

Over time, as catastrophe models are updated to reflect the changing environment, the updated views of risk will be considered as part of regular premium rate reviews. This will mitigate the risk that cyclone pool premiums and associated financial projections fail to reflect the best scientific views of risk.

There are a number of ways climate risk might impact pricing adequacy. Table 5.2 summarises potential risks that climate change poses to premium adequacy and the intended approach to mitigate the risk:

Table 5.2 – Climate risk impact on premium adequacy

Issue	Risk control
Catastrophe models fail to reflect climate change or the latest science.	New model versions will be tested, considered, and implemented where appropriate, as they become available; models will be monitored for how they address climate risk.
Climate change requires adjustment in overall revenue or relativities.	Pricing reviews will consider the issue and act consistently in line with agreed principles.
ARPC lacks an understanding of climate risk drivers.	ARPC will engage with experts in the actuarial, scientific, and engineering communities to maintain awareness of the issues.

²¹ Lin, Y., Zhao, M., Zhang, M. (2015). Tropical cyclone rainfall area controlled by relative sea surface temperature. *Nature Communications*. 6 (1): 6591. Bibcode:2015NatCo...6.6591L. doi:10.1038/ncomms7591. PMC 4382685. PMID 25761457.

²² Sun, Y., Zhong, Z., Li, T. et al. (2017). Impact of Ocean Warming on Tropical Cyclone Size and Its Destructiveness. *Nature Scientific Reports* 7, no.8154.

Building codes and land use polices fail to allow for changing risk and/or fail to adequately “future-proof” climate risk; for example, if there is poleward migration of cyclones into areas currently lacking the strongest building codes.	Geographic relativities in the premium formula will reflect higher vulnerability in these regions.
ARPC lacks information to adequately price for risk.	ARPC is collecting detailed exposure data from insurers to better understand risk; adjustments may be made in data standards over time to focus on emerging risks.
Exposure shifts into areas subject to a high level of storm surge risk, such as beachfront properties.	Detailed exposure data will allow ARPC to detect such movements; prices may be adjusted to reflect risk; ARPC data can inform other government agencies of potential problems. The impact of new builds on the cyclone pool is expected to be considered as part of the 2025 review of the cyclone pool.

5.2.3 Natural climate cycles

The occurrence of tropical cyclones is influenced by natural variability, which refers to fluctuations in atmospheric and oceanic patterns that are not attributed to human activities. This natural variability plays a significant role in determining the number of tropical cyclones observed each year and their location.

The El Niño Southern Oscillation (ENSO) phenomenon is a dominant source of year-to-year climate variability in the Pacific region, influencing tropical cyclones in several ways²³. During El Niño events, characterised by warmer-than-average sea surface temperatures in the central and eastern tropical Pacific, tropical cyclone activity tends to be suppressed or weakened. The increased vertical wind shear and atmospheric stability associated with El Niño create less favourable conditions for tropical cyclone development and intensification. On the other hand, during La Niña events, marked by cooler-than-average sea surface temperatures in the central and eastern tropical Pacific, tropical cyclone activity is often enhanced. La Niña conditions reduce vertical wind shear and promote greater atmospheric instability, providing a more conducive environment for tropical cyclone formation and intensification.

ENSO also affects where cyclones are likely to form and travel. During El Niño conditions, the area of favourable conditions needed for tropical cyclone genesis shifts eastward, leading to a systematic north-eastward shift in the trajectory of tropical cyclones. As a result, there is typically a decrease in the number of tropical cyclones occurring in the Australian region. Conversely, during La Niña episodes, an increase in tropical cyclone activity is observed in the vicinity of eastern Australia and off the northwest coast of Australia²⁴.

The Indian Ocean Dipole (IOD) can also affect tropical cyclones, though its effect is secondary and more difficult to detect. The IOD refers to changes in the difference between sea surface temperature of the tropical western and eastern Indian Ocean. A negative IOD means warmer water near Australia and provides a more conducive environment for tropical cyclone formation and intensification. Additionally, positive phases of the IOD tend to occur during El Niño events and negative phases of the IOD in La Niña events^{25, 26}.

²³ Tu’uholoaki, M, et al. (2022). Tropical cyclone climatology, variability, and trends in the Tonga region, Southwest Pacific. *Weather and Climate Extremes*. 37/100483.

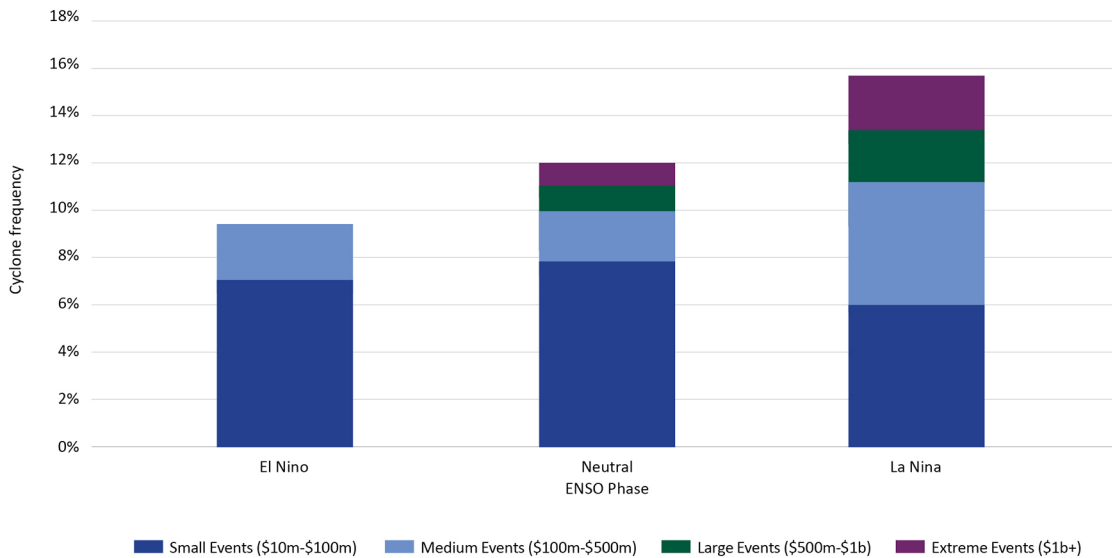
²⁴ Magee, A. D., Kiem, A. S. (2020). Using Indicators of ENSO, IOD, and SAM to Improve Lead Time and Accuracy of Tropical Cyclone Outlooks for Australia. *Journal of Applied Meteorology and Climatology*. V59/11.

²⁵ Bureau of Meteorology (2022). Indian Ocean influences on Australian climate.

²⁶ Saha, K. K., Wasimi, S. A. (2013). Interrelationship between Indian Ocean Dipole and Australian Tropical Cyclones. *International Journal of Environmental Science and Development*. Vol 4, No.6. DOI:10.7763/IJESD.2013.V4.431

The correlation between ENSO and tropical cyclones in Australia is well established and is an important tool for understanding the level of risk and year-to-year variability. Figure 5.2 shows tropical cyclone frequency and severity based on observed events and losses derived from the Insurance Council of Australia's (ICA) catastrophe loss data.

Figure 5.2 – Tropical cyclone frequency by event size and ENSO phase



Source: Insurance Council of Australia Historical Catastrophe List

The Commonwealth Scientific and Research Organisation (CSIRO) has recently released research indicating that human-caused greenhouse gas emissions may lead to strong El Niño and La Niña events occurring more often. CSIRO has also said that extremely positive IOD events are likely to increase as climate changes. In the near term, the effect of the ENSO and other natural cycles is expected to be the dominant driver of risk for the cyclone pool. Over time, if cycles are made more extreme by climate change, increased volatility of cyclone pool experience can be expected.

5.2.4 Current cyclone outlook

Australia is moving into an El Niño phase of the ENSO cycle. Historically, both the frequency and size of losses have been lower during this phase.

Australia is moving into an El Niño phase of the ENSO cycle, which may lead to lower cyclone activity.

5.3 Reinsurance market developments

Aon's Reinsurance Market Dynamics Report for June and July 2023 notes that the 1 July 2023 reinsurance renewal season took place against a backdrop of several years of major catastrophe losses in the region, including large cyclone and flood losses in New Zealand in the first quarter. Loss activity helped drive double-digit rate increases in 2023, in addition to similar increases in 2022 which followed significant flood losses in Australia²⁷.

Aon notes that demand-supply pressures were alleviated by the implementation of the cyclone pool, which is set to assume more than 90 per cent of the market's cyclone exposure for Home, Strata, and SME

²⁷ Aon, *Reinsurance Market Dynamics*, June and July 2023, pp 12-14.

policies. Further, as a result of the cyclone pool, the market purchased around 10-15 per cent less catastrophe limit at mid-year than in 2022, easing demand-supply pressure at renewal.

While reinsurance premium rates remain high, these costs are likely to be passed on to policyholders. The cyclone pool reduces overall costs as reinsurance for cyclone is no longer required from the private market. Reinsurance market price increases on non-cyclone perils should result in re-allocation of the net cost of reinsurance across portfolios to policies that are exposed to the relevant perils.

The cyclone pool is designed to relieve cost pressure on insurance markets and have a positive influence on the amount of capacity required for Australia. However, recent poor claims experience in non-cyclone perils and the high inflation environment may put upward pressure on reinsurance premiums.

5.4 Policy and regulatory environment

5.4.1 Joint Select Committee on Northern Australia

The Joint Select Committee's (the Committee) *'First Report into the Cyclone Reinsurance Pool'*²⁸ was published in March 2023. After receiving submissions and conducting public hearings, the Committee made seven recommendations in this Report.

Relevant to ARPC, the Committee recommended that:

- The Australian Government ensure that future releases of modelling are provided well in advance of key dates in the ongoing roll-out of the cyclone pool.
- The Australian Government review the availability and coverage of insurance in Northern Australia, specifically the insured versus the uninsured, including non-participation, and the impact of the 48-hour clause on the availability and cost of insurance premiums.
- The Australian Government announce a position on the inclusion of marine insurance in the cyclone pool.
- The Australian Government facilitate a coordinated approach to land use planning, building codes, mitigation and disaster resilience that includes the National Emergency Management Agency (NEMA) and other levels of government.
- The Australian Government's 2025 review of the cyclone pool consider evidence and data on whether to 'sunset' the cyclone pool's coverage of policies for new builds past a certain date, and how to reinforce the policy objective to move to parity of cost and access for all Australians.
- Future reviews of the cyclone pool consider the sum insured limit under the business property policy.

ARPC will continue to prepare and distribute information on the cyclone pool to support transparency on the performance of the cyclone pool.

5.4.2 Regulatory developments

Support for resilient homes

There is significant activity underway to support the development of resilient homes in Australia. Three notable and recent developments are:

²⁸ Joint Select Committee on Northern Australia – First Report on the Cyclone Reinsurance Pool - https://parlinfo.aph.gov.au/parlInfo/download/committees/reportjnt/RB000038/toc_pdf/InquiryintotheCycloneReinsurancePool.pdf.

- The development by the Resilient Building Council (RBC) of a single multi-hazard standard, so that homeowners or renters can understand how a residence would be resilient to certain perils. This standard is due to be released in 2024²⁹.
- The establishment of the Hazards Insurance Partnership (HIP) under the management of NEMA.
- The establishment of the Disaster Ready Fund (DRF) in 2019, providing investment in projects that support the management of the impacts of disasters. The DRF has provided \$20 million in funding to the Household Resilience Program (HRP), which provides funding for retrofit solutions to support reduced insurance premiums for policyholders in Queensland.

While the positive impacts of ‘resilience’ developments will take significant time to materialise, the longer-term outlook is for increasing awareness of the need for homes that are resilient against specific perils, better knowledge, standards, and skills to develop such homes, and price signals (for example, cost of home loans and home insurance) to support resilience investment. Over time, it is anticipated that this will reduce the risk of damage to homes by natural perils, with the consequent positive impact on the affordability and availability of Home insurance.

NEMA and the Hazards Insurance Partnership

NEMA is managing the HIP. The Australian Government has allocated \$22.6 million over four years for a series of initiatives to put downward pressure on insurance premiums and target mitigation investment to help improve insurance affordability over time. The HIP is working with the Australian Climate Service (ACS) to create a dataset to better understand insurance affordability and underinsurance, which will inform policy and decision making.

The cyclone pool will support recent regulatory developments to promote resilient homes through sharing data and insights on exposure, insurance affordability, and mitigation measures. The cyclone pool also provides reinsurance premium discounts for Home properties that have undertaken property level risk mitigation.

²⁹ <https://www.abc.net.au/news/2023-03-01/qld-disaster-resilience-weather-cyclone-climate-housing/102030160>



Section 6: Assessment of premium adequacy

This section assesses the adequacy of cyclone pool premiums in meeting the following legislative objectives as set out in the TCI Act:

- To be cost-neutral to the government over the long-term
- To deliver reinsurance to medium and high-risk properties at the lowest possible cost
- To keep premiums for low-risk properties at a level comparable to what would be charged in the private market, and
- To maintain incentives to reduce and mitigate the risk of losses.

6.1 Long-term cost-neutrality

This section takes a long-term prospective view of premium adequacy. Premiums are compared to modelled cyclone pool cost for the exposure as at 1 July 2023, and for the ultimate exposure when the cyclone pool is fully mature.

Section 6.1.3 considers the appropriateness of the pricing AAL in comparison to historical experience.

6.1.1 Premium adequacy ratio

The modelled cyclone pool cost for the exposure of the cyclone pool as at 1 July 2023 is estimated to be \$373.7 million, representing the estimated AAL calculated in the Initial Pricing Review plus an allowance for ARPC's operating expenses and eligible insurer claims handling expenses. ARPC's operating expenses are set as two per cent of premium as assumed in the Initial Pricing Review, representing the long-term view of expenses. This differs from the budgeted expenses in Section 4.2, which are expected to be higher in the start-up phase.

Expected premiums were estimated by:

- Inflating the total premium pool from the Initial Pricing Review to 1 July 2023 (using assumptions outlined in Appendix B).
- Applying estimated proportion of ultimate exposure represented by insurers in the cyclone pool as at 1 July 2023 (43 per cent) to the inflated total premium pool.

Table 6.1 – Actual vs Expected Premium adequacy ratio (exposure as at 1 July 2023)

	Modelled cyclone pool cost	Cyclone pool premium	Premium adequacy ratio
Expected as at 1 July 2023 (\$m)	354.1	354.1	100.0%
Actual as at 1 July 2023 (\$m)	373.8	390.5	104.5%
<i>Actual vs expected (% difference)</i>	<i>5.6%</i>	<i>10.3%</i>	<i>4.5%</i>
Expected ultimate cyclone pool exposure (\$m)	822.9	822.9	100.0%

Premium income for the current exposure is \$390.5 million, which is in line with the modelled cyclone pool cost of \$373.7 million. Therefore, to the extent that the Initial Premium Rates were adequate, premiums collected for the cyclone pool's current risk exposure are also expected to be adequate. When the cyclone pool is fully mature and all eligible exposure has been ceded, the premium adequacy ratio is expected to



be 100% (with premium and modelled cost equal to \$822.9 million) and therefore meet the objective of long-term cost-neutrality.

For the current exposure, premium income is \$36.1 million higher than expected due to differences in the mix of business of properties currently reinsured compared to the expected ultimate exposure.

Action 5: Review risk pooling in the premium rates to confirm that rates are still appropriate for the exposure once the majority of insurers have joined.

Overall premiums are \$36.1 million higher than expected, reflecting the mix of business currently reinsured by the cyclone pool. Premiums are expected to be adequate for the current exposure.

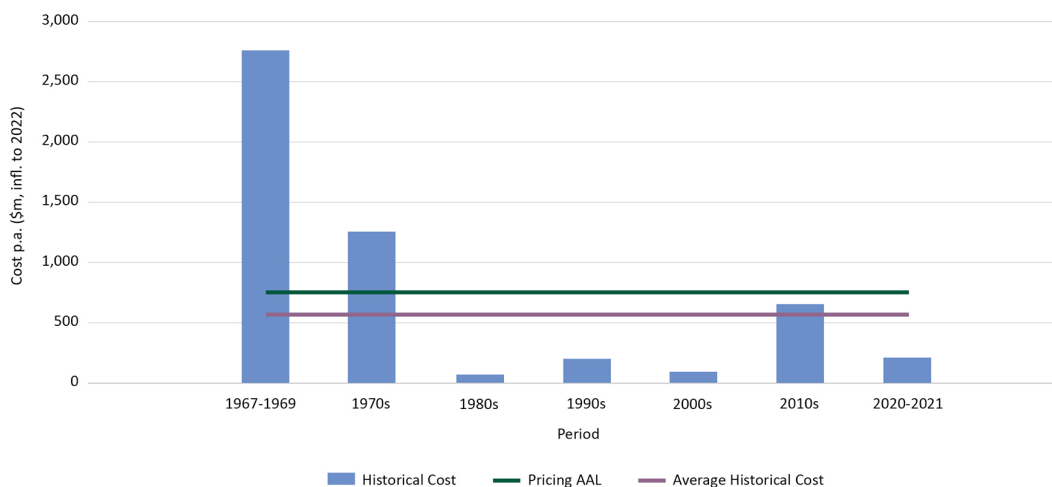
6.1.2 Comparison of the pricing AAL to historical experience

Tropical cyclones in Australia are infrequent events that are influenced by multi-decadal weather patterns. An observational record spanning hundreds of years would be required to adequately capture the distribution of potential losses, and even then, future events may differ from historical events. Therefore, it is best practice in the (re)insurance industry to estimate cyclone losses using catastrophe loss models which simulate thousands of synthetic events to supplement the limited observational record.

ARPC used a panel of catastrophe models to estimate the expected loss from cyclone events covered by the cyclone pool. For the Initial Premium Rates, the AAL was estimated to be \$742 million. In this section, the pricing AAL is compared to historical experience to assess long-term cost-neutrality.

The ICA’s historical loss dataset containing insurance losses from catastrophic events has been used to estimate the historical cost of cyclones in Australia. Cyclone losses from ICA data have been adjusted for building cost inflation and changes in exposure to make the losses comparable to the pricing AAL determined in the Initial Pricing Review. An allowance for small events not included in the ICA data has been added, and losses from exposures not covered by the cyclone pool have been excluded, such as losses on commercial properties with a value greater than \$5 million. Figure 6.1 compares the pricing AAL to adjusted annual cyclone losses from the ICA data.

Figure 6.1 – Pricing AAL vs historical cost of cyclones in Australia



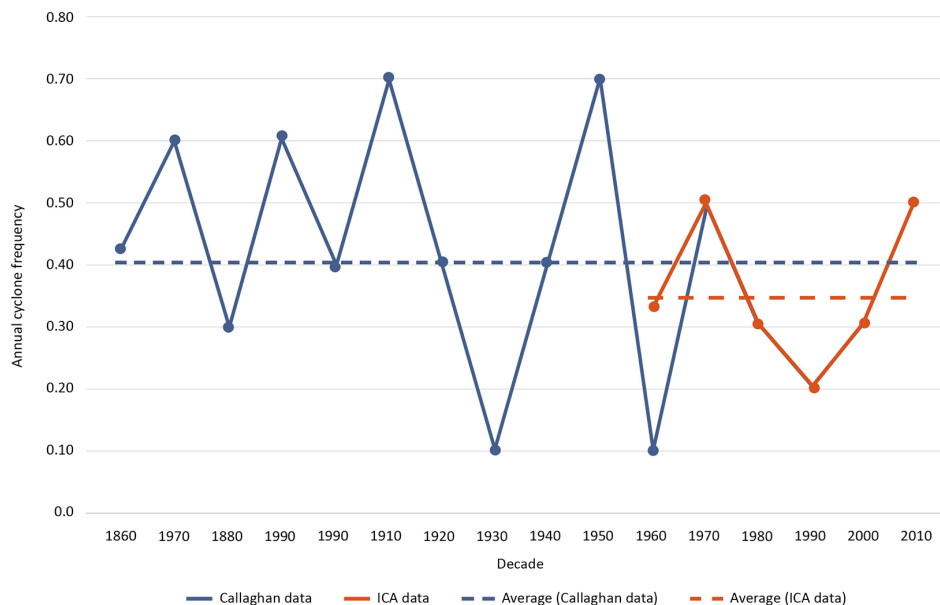
Source: Insurance Council of Australia Historical Catastrophe List



The average historical loss from 1967 to 2022 (per annum) was \$575.4 million. The pricing AAL of \$742.0 million is 29 per cent higher than the adjusted average annual historical cost of cyclones from 1967 to 2022.

The historical loss experience above represents a relatively short period of 55 years and may not reflect longer-term tropical cyclone activity. The paper *Variability and decline in the number of severe tropical cyclones making landfall over eastern Australia since the late nineteenth century*³⁰ by Jeff Callaghan and Scott Power (Callaghan paper) approximates severe cyclone frequency³¹ from 1862 to 2010 on the east coast of Australia.

Figure 6.2 – Historical severe cyclone frequency



Source: *Variability and decline in the number of severe tropical cyclones making landfall over eastern Australia since the late nineteenth century* by Jeff Callaghan and Scott Power.

As shown in Figure 6.2, the average annual severe cyclone frequency in the period covered by the ICA data (0.35) is 14 per cent lower than the average annual severe cyclone frequency observed over the longer period covered in the Callaghan paper (0.41). This suggests the 55 years covered by the ICA data may understate tropical cyclone activity compared to the long-term average.

The 55-year history of available data does not include any large events hitting large population centres. Such an event is plausible and therefore should be allowed for when setting the pricing AAL, which considers the full distribution of potential cyclone losses to meet the requirement for long-term cost-neutrality. The inclusion of extreme events (even capped at \$15 billion as described in Appendix B) has a material impact on the pricing AAL and is the main driver of the difference between the pricing AAL and the average annual historical loss.

Catastrophe models simulate a full distribution of potential outcomes, of which the pricing AAL is the mean. The modelled probability of having loss experience less than or equal to the observed 55-year average historical loss (of \$575.4 million) is 32 per cent (on average across the models). Therefore, the

³⁰ Callaghan, J., Power, S.B. Variability and decline in the number of severe tropical cyclones making landfall over eastern Australia since the late nineteenth century. *Clim Dyn* 37, 647–662 (2011). <https://doi.org/10.1007/s00382-010-0883-2>

³¹ Severe cyclone frequency in the Callaghan paper includes cyclones impacting the east coast of Australia (between Cairns and Ballina) that show evidence of severe structural wind damage that is consistent with a Category 3, 4, or 5 tropical cyclone.

observed experience is a reasonably plausible outcome according to the catastrophe modelling. Historical experience does not provide sufficient evidence to conclude that the pricing AAL does not reflect the underlying long-term average cost of tropical cyclones.

The pricing AAL is higher than actual experience from 1967-2022, as it reflects the full distribution of plausible events. The pricing AAL is consistent with the objective of long-term cost-neutrality.

6.2 Maintaining long-term cost-neutrality

As the cyclone pool matures, it is expected that premium rates will be adjusted to reflect the changing external environment and changing risk profile of exposure. The impacts of building cost inflation and climate change will need to be monitored, as discussed in sections 5.1 and 5.2. This section discusses how changes in insurance take-up rates, new dwelling growth, and insurer data reporting may impact how premium rates are managed over time.

6.2.1 Overall insurance take-up

Improving insurance take-up by policyholders is an objective of the cyclone pool. The Initial Pricing Review assumed that 98 per cent of properties are insured in low-risk areas, and 80 per cent of properties are insured in high-risk areas. Given that the highest risk areas have the lowest premium adequacy, if actual take-up rates in high-risk areas are higher than assumed, the premium rates may need to be increased over time to maintain cost-neutrality.

This could occur due to existing differences between the Initial Pricing Review assumptions and actual experience or could develop over time as a result of the introduction of the cyclone pool. Once all insurers have joined the cyclone pool, observed take-up rates will be monitored against estimates in the Initial Pricing Review to understand the impact on adequacy.

6.2.2 Flood insurance take-up

Policyholders may opt-out of flood cover to reduce their insurance premium. The cyclone pool does not charge any reinsurance premium for flood (or cover any claims cost) if the underlying policy has opted out of flood coverage. The Initial Pricing Review assumes that flood insurance take-up decreases as flood risk increases. Table 6.2 compares observed flood insurance take-up rates for Home Buildings and Contents policies with expectations from the Initial Pricing Review, by modelled flood claims cost band. The modelled flood claims cost bands reflect the total flood cost for a \$500,000 sum insured property.

Table 6.2 – Actual vs expected flood insurance take-up by overall flood risk band (Home Buildings and Contents, exposure as at 1 July 2023)

Total flood modelled claims cost band (for \$500k SI)	Est. sum insured (\$b)	Actual	Expected	A less E
Nil	1,108	92%	92%	0%
Less than \$50	30	79%	90%	-11%
\$50 to \$250	36	76%	85%	-9%
\$250 to \$500	25	79%	82%	-3%
\$500 to \$1,000	18	67%	71%	-4%
\$1,000 to \$1,500	21	70%	62%	8%
More than \$1,500	33	53%	34%	19%
Total	1,271	89%	88%	0%



While overall flood insurance take-up is in line with expected (89%), flood insurance take-up is more than assumed in the pricing for properties exposed to higher flood risk. As high-risk policies pay a reinsurance premium lower than their modelled cost, a greater proportion of these policies decreases the premium adequacy ratio and may require premium rates to be increased over time to maintain cost-neutrality. However, of the insurers who have joined the cyclone pool to date, many of them do not allow policyholders to opt out of flood insurance. Therefore, the exposure as at 1 July 2023 may have a greater take-up rate for high flood risk properties than the ultimate cyclone pool exposure.

Insurers' practices with regard to allowing policyholders to opt out of flood insurance, may be changing. Such changes could impact the factors discussed above, for rates of both overall and flood insurance take-up. ARPC will continue to monitor the rates of insurance take-up, both overall and for flood, and assess the impact on any deviation from expected on the adequacy of cyclone pool premiums.

The proportion of high flood risk policies for the exposure as at 1 July 2023 is higher than assumed in the pricing, which may require premium increases over time to maintain cost-neutrality.

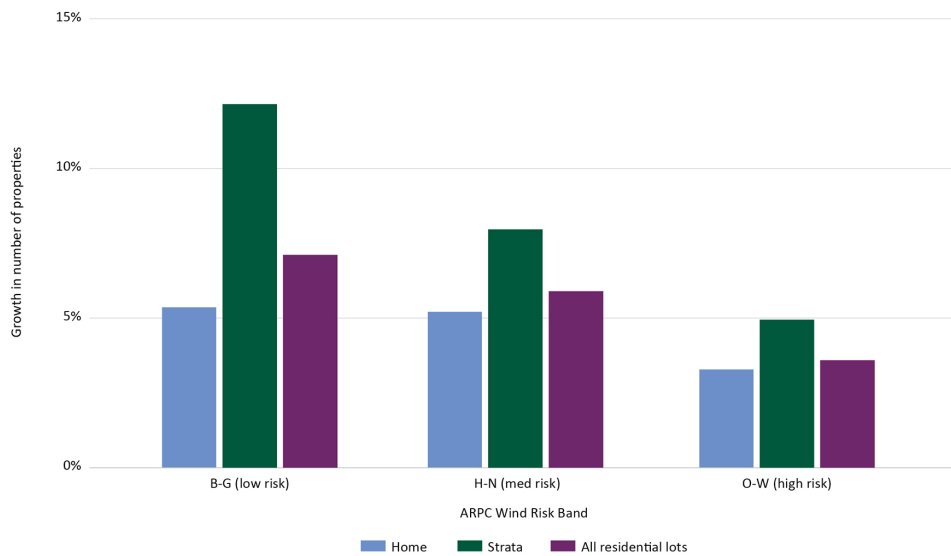
6.2.3 Exposure profile of new buildings

The risk profile of the cyclone pool will change as the number of properties in Australia grows. Given the risk pooling between low and high-risk properties, the ongoing premium adequacy of the cyclone pool is impacted by the mix of exposure between segments. Disproportionate growth in higher risk areas may require premium increases to maintain long-term cost-neutrality.

Future premium rates may differentiate between buildings constructed before and after the commencement of the cyclone pool. The introduction of higher premium rates for new buildings will be considered in the 2025 cyclone pool review. Any changes to premium rates for new buildings will seek to encourage resilient construction.

Figure 6.3 shows the annual growth of unique addresses from February 2019 to May 2023. This is grouped by the ARPC Wind Risk Band and shown for Home and Strata. Band 'B' has low cyclone risk, and band 'W' is the highest risk band. The number of properties in bands 'B' to 'G' increased by 7.0 per cent over the four year period, whereas the number of properties in bands 'O' to 'W' increased by 3.6 per cent. The growth in the past four years indicates that there is a greater rate of property growth in low-risk areas than high-risk areas. The current distribution of growth rates does not pose a risk to overall cyclone pool adequacy however, it is important to note that this trend was prior to the establishment of the cyclone pool and hence does not reflect the impact of lowered premiums in high-risk areas.



Figure 6.3 – Growth in building lots between February 2019 and May 2023

Source: Geoscape Geocoded National Address File (G-NAF)

Action 6:

Analyse and monitor insurance take-up rates as the cyclone pool matures to maintain premium adequacy and understand the impact of the cyclone pool on insurance availability.

There is a risk that providing lower premiums to medium and high cyclone risk properties may disproportionately incentivise growth in these areas. This would be an unintended consequence of the cyclone pool design and impact the adequacy of the premium rates.

6.2.4 Premium and claims reporting

ARPC relies on insurers to provide complete and accurate data for both premiums and claims. Inaccurate and incomplete submission of data could understate or overstate the cyclone pool's risk exposure, premium income or claims cost. Larger insurers report from numerous legacy systems, with different insurance products transacted via distinct systems. This creates challenges in collating records to a single dataset for the purpose of submitting information to ARPC.

Premium rates may need to be adjusted over time to reflect systemic biases in premium reporting or in claims management that cannot be addressed through the insurer review processes described below.

Premium

Regular insurer reviews will be conducted to mitigate this risk, by testing the underlying source systems for validity and completeness of inputs. All new insurers will be reviewed within 18 months of paying their first quarterly premium. Subsequently, a combination of cyclical and risk-based approaches will be used in selecting insurers to be reviewed.

Currently ARPC's premium formula mostly charges an average premium rate for rating factors where the insurer does not collect or is unable to provide rating information.

Action 7:

Incentivise insurers to collect additional risk data to increase premium accuracy for policyholders by considering introducing penalty premium rates for unknown rating data.

Claims

Claims are managed directly by insurers, with costs subsequently recovered from the cyclone pool. Given that the cyclone pool reinsures 100 per cent of eligible claims, insurers have limited financial incentive to reduce claims cost. This may lead to claims leakage (the cost of settling claims being higher than required if managed efficiently), which increases the cost of claims from cyclone events and poses a risk to the long-term cost-neutrality objective. This risk will be mitigated using claim validations, audits, and portfolio benchmarking. The claims audit will be performed once claims for a cyclone event have been substantially paid. A sample of claims will be assessed to determine whether they have been paid in accordance with claims processing guidelines, and underlying documents will be validated to assess whether the claim amount is consistent and reasonable.

6.3 Premium levels by cyclone risk

The cyclone pool premiums are designed to minimise premiums for medium and high-risk properties, while keeping premiums for low-risk properties at a level comparable to what would be charged in the private market. Table 6.3 shows the premium adequacy ratio by modelled cyclone pool cost band. The premium adequacy ratio for low-risk properties is much higher than for high-risk properties, which is an expected result of the risk pooling.

Table 6.3 – Premium adequacy ratio by modelled cyclone pool cost band (exposure as at 1 July 2023)

Cyclone risk	Modelled cyclone pool cost band	Number of properties (000s)	Average modelled cyclone pool cost (\$)	Average cyclone pool premium (\$)	Premium adequacy ratio
Low to high risk	Less than \$100	1,383.4	52	65	126.4%
	\$100 to \$500	813.8	169	199	117.4%
	\$500 to \$1,000	137.8	597	588	98.5%
	\$1,000 to \$2,000	37.2	1,100	954	86.7%
	\$2,000 to \$5,000	5.7	3,183	1,934	60.8%
	More than \$5,000	4.5	5,147	2,410	46.8%
Total		2,382.4	157	164	104.5%

Excludes nil risk properties

Number of properties includes Buildings, Contents or Combined policies

For low-risk properties, the cyclone pool premium is slightly higher than the modelled cyclone pool cost. This is an expected outcome in the design of the cyclone pool; premiums for low-risk policies are designed to be comparable to private sector premiums which include a profit margin above the risk premium. Considering recent increases in private market reinsurance premiums, it is unlikely that the allowance for margins is overestimated. For high-risk properties, the cyclone pool premium is higher than for low-risk properties but significantly lower than the modelled cyclone pool cost. Premiums for high-risk properties are set to be as low as possible while keeping premium for low-risk properties comparable to the private market and maintaining long-term cost-neutrality in aggregate for the cyclone pool. The cyclone pool does not charge premium for properties with no cyclone risk.

The cyclone pool premium shown is a reinsurance premium charged to insurers however, insurers are required to reflect the impact of joining the cyclone pool in the premiums they charge to policyholders. The Australian Competition and Consumer Commission (ACCC) has been directed by the government to



monitor how the industry achieves this. The ACCC collects data to monitor prices, costs, and profits for cyclone pool-eligible products and will provide a report each year.

Cyclone pool premiums are materially below modelled cyclone pool costs for high-risk properties and consistent with modelled cyclone pool cost plus a margin for low-risk properties.

6.4 Risk mitigation

Improving the resilience of insured assets to cyclone losses through risk mitigation reduces claims costs to the cyclone pool, while improving the built environment. The cyclone pool premiums are designed to maintain incentives to reduce and mitigate the risk of losses. The premium structure accounts for large scale mitigations, such as levees, in the base rates. Properties built after 1981 in high-risk areas attract lower premiums, reflecting the building standards after this time, which required engineering solutions that better protect properties from wind damage. Lower premiums are charged for properties with construction and roof types, such as concrete, which demonstrate greater resilience to wind damage.

The premium structure for Home policies also allows for specific mitigation discounts, which are applied when homeowners have retrofitted their home to improve its resilience. The mitigation rating factors, and their associated discounts, are shown in Table 6.4. Over time, additional discount factors may be added to reflect new research relating to mitigation or developments in common practice.

Table 6.4 – Risk mitigation rating factors and discounts (Home Buildings and Contents)

Mitigation activity	Wind premium discount
Roller door bracing upgrade or retrofit replacement of roller door (compliant with AS 4505:2012) – on homes built pre-2012	8%
Window protection to all windows (e.g. cyclone shutters)	10%
Roof structure tie-down upgrades (e.g. over-batten roof system) - on homes built pre 1982	20%
Complete roof replacement and structure tie-down upgrades to current standards - on homes built pre 1982	30%

The total discount for mitigation applied to premiums as at 1 July 2023 is \$4.9 million. Discounts applied over time will be tracked to assess whether cyclone pool premium discounts are encouraging mitigation. Several insurers joining in the second half of the 2023 calendar year have notified ARPC that they will be adding mitigation questions to their underwriting processes as a result of joining the cyclone pool (a positive sign that the cyclone pool is promoting risk mitigation).

Table 6.5 shows the breakdown of the \$4.9 million in total premium discount by ARPC Wind Risk Band. The total discount increases for higher wind risk properties. This is an expected outcome as the benefits of risk reduction are higher for these properties leading to more investment in these works. Interestingly, Wind Risk Band 'W' (made up of exposure in north-west Western Australia) has lower rates of discount take-up than 'L' to 'U'. Bands 'L' to 'U' have a greater proportion of policies in Queensland. The higher discount in these areas shows the benefit of the Queensland Household Resilience Program, which offers up to \$11,250 in funding for selected mitigation. The cyclone pool premium discounts align with the activities funded by this program.



Table 6.5 – Number of policies with mitigation discounts and average discount percentage by grouped Wind Risk Band (exposure as at 1 July 2023)

Wind Risk Band	Number of properties (000s)	Total cyclone pool premium discount (\$000s)	Discount % of Wind premium
B to F	0.3	4.6	0.01%
G to K	3.8	182.4	0.23%
L to P	18.3	2,125.7	2.86%
Q to S	6.2	1,182.0	4.06%
T to U	4.6	1,222.8	4.37%
W	0.4	157.4	0.88%
Total	33.6	4,874.9	1.51%

Further to direct reductions in cyclone pool premium rates for large-scale mitigation and individual home mitigation, ARPC supports risk mitigation through the following:

- **Thought leadership:** ARPC has partnered with the Cyclone Testing Station (CTS) at James Cook University (JCU) to provide research relating to mitigation activities for Strata and SME properties, and to research strategies for increasing the resilience of large strata buildings to damage from wind-driven rain. The CTS is part of the Engineering School at JCU and specialises in engineering research into property damage from cyclonic winds.
- **Data sharing across government:** the Hazards Insurance Partnership is a government initiative managed by NEMA to help communities better prepare for disasters. ARPC has engaged with NEMA and the Australian Climate Service to identify areas where ARPC's data assets may be better used to target mitigation investment.

Current cyclone pool premiums are discounted by \$4.9 million for mitigation activity. ARPC seeks to expand incentives for risk mitigation in the future.

Action 8:

Consider how risk mitigation discounts (that currently exist for Home) can be extended to SME and Strata and include in the premium rating structure where appropriate.

6.5 Insurance availability and cyclone pool coverage

If the premium rates meet the legislative objectives set out in the TCI Act, insurance availability in high-risk cyclone areas will likely increase. Therefore, monitoring insurance availability in high-risk areas provides a useful metric for monitoring the appropriateness of the premium rates.

Misalignment on views of cyclone pool coverage between ARPC and the private (re)insurance market may impede the objective of increasing availability and affordability of insurance in high-risk regions.

This section summarises initial conclusions from insurance availability monitoring and the results of analysis on cyclone pool coverage.

6.5.1 Availability of insurance

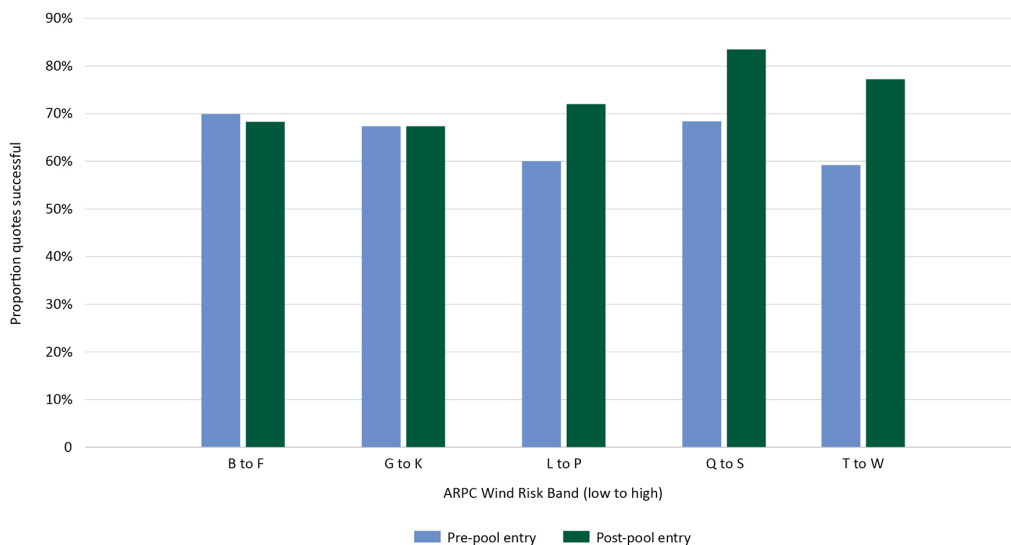
Home Buildings insurance online quote data has been used in the analysis below to assess the initial impact of the cyclone pool on the availability of insurance. Insurers may not quote certain risks, indicating

that the insurer does not want to write the policy. This is likely an indication of a broader underwriting strategy; for example, the insurer may decline to write policies in high-cyclone risk areas.

Figure 6.4 analyses the proportion of successful quotes collected in the months preceding insurers joining the cyclone pool, compared to the proportion of successful quotes collected in the month following.

Figure 6.4 shows the results by ARPC Wind Risk Band. The proportion of successful quotes increases for all groups, with notable increases for the higher wind risk bands. Successful quotes in bands 'Q' to 'S' and 'T' to 'W' were 68 per cent and 59 per cent respectively prior to joining the cyclone pool and are now both above 75 per cent.

Figure 6.4 – Proportion of successful quotes pre- and post-cyclone pool entry (insurers joined to 1 July 2023)



Source: Quote data provided by Finity Consulting

The increase indicates that insurers in aggregate have increased their underwriting appetite for high cyclone risk areas since joining the cyclone pool. This is a positive early indication of the cyclone pool's impact on improving insurance availability in high-risk areas.

There are early indications of increased availability of insurance in high cyclone risk areas due to the introduction of the cyclone pool.

6.5.2 Cyclone-related risk covered by the cyclone pool

To meet the cyclone pool's objective of minimising premiums for high-risk properties, alignment is required between the cyclone pool and private market insurers and reinsurers on the risk coverage that is transferred into the cyclone pool. If multiple parties charge premiums for the same risk, policyholder premiums will be overstated. This section estimates what proportion of cyclone-related risk is covered by the cyclone pool and what proportion is retained by the private market.

The reinsurance coverage provided by the cyclone pool, as defined in the TCI Act, covers events that meet the technical definition of a category 1 cyclone and above. The coverage period extends from the time a cyclone meets that definition to 48 hours after the downgrade of the event. To assess the exposure to cyclone risk from losses outside this definition, the COMBUS model event set has been adjusted by removing events that would not be covered by the cyclone pool. This includes removing:

- Events where the cyclone strength is below the category 1 definition and therefore will not be declared by ARPC.
- Losses that occur more than 48 hours after the downgrade of the event.

Adjusting the event set to exclude losses that would not be covered by the cyclone pool reduces the total cyclone losses by 2.5 to 3 per cent. It is important to note that before the introduction of the cyclone pool, there already existed gaps in reinsurance coverage in private market reinsurance arrangements where the coverage window of a single event typically doesn't cover all losses.

The above analysis relies on one model and thus only one view of the cyclone risk covered by the cyclone pool. Analysis using alternative models, data sources, or assumptions may yield different results.

ARPC estimates that only 2.5 to 3 per cent of the total cyclone AAL estimated by the catastrophe model is not covered by the cyclone pool. The cyclone pool coverage definition is not expected to materially impact the ability of the cyclone pool to meet its objective of reducing cyclone premiums for medium and high-risk properties.



Section 7: Assessment of adequacy of insurance liabilities

This section assesses the adequacy of the cyclone pool's insurance claims liabilities. In future reports, the adequacy of insurance liabilities will be tested against observed claims development. However, given the cyclone pool has only been operational for one cyclone season, this FOR summarises the actuarial methodology for insurance liability setting and comments on the suitability of the approach.

ARPC has declared four DCEs, of which only two, TC Gabrielle and TC Ilsa, caused property damage resulting in claims for the cyclone pool.

7.1 Outstanding claims liability

Table 7.1 shows the outstanding claims liability estimate at the central estimate and the 75 per cent probability of sufficiency (PoS) for the cyclone pool.

Table 7.1 – Outstanding claims liability estimates as at 30 June 2023 for the cyclone pool

	Central Estimate	75% Probability of Sufficiency
Outstanding Claims Liability (\$000s)	68.4	99.6

The outstanding claims liability was calculated using a credibility-weighted average between ultimate costs based on actual experience (chain ladder ultimate³²) and catastrophe model loss estimates³³.

When a DCE first arises, there is little information available on actual claims costs. Therefore, a higher weighting is initially placed on the catastrophe loss model estimates. As time passes, more accurate information on the costs incurred is received from insurers, and a higher credibility weighting is placed on actual experience.

This approach is consistent with standard actuarial practice.

7.2 Risks and uncertainty for outstanding claims liability

Uncertainty in the outstanding claims liability is high due to the following factors:

- **Data limitations:** ARPC operates as a reinsurer for the cyclone pool. Typically, there is a lag between information received by the insurer and when it is passed onto ARPC.
- **Benchmarks:** Due to very limited claims information to date, chain ladder development factors are based on industry benchmarks of cyclones including TC Yasi (2011), TC Oswald (2013), and TC Marcia (2015).
- **Catastrophe model estimates:** The selected ultimate cost for each DCE is based partially on catastrophe loss model estimates. There is inherent uncertainty in these estimates, particularly if the cyclone location and path is not well known at the point the estimates are derived. The adequacy of the outstanding claims liability is therefore subject to the same risks and uncertainties as the catastrophe loss model estimates.

The size of the claims liability, in the context of the expected premium income of the cyclone pool, is immaterial and therefore the risk to the financial outlook of the cyclone pool is minimal.

³² Weighted average of ultimate claim costs from incurred chain ladder and paid chain ladder models.

³³ Loss estimates from the RMS and COMBUS catastrophe models, estimated separately for each DCE.

The approach used to estimate insurance liabilities is appropriate considering the data available and the high level of uncertainty in estimating catastrophe losses.

There is little risk to the financial outlook of the cyclone pool from the adequacy of outstanding claims liability due to both TC Gabrielle and TC Ilsa causing only minor losses to the cyclone pool.



Section 8: Observations on capital management and available assets

8.1 Overview of the factors affecting the capital position of the cyclone pool

The primary objective of capital management for the cyclone pool is that assets are available to meet financial obligations where possible.

The cyclone pool meets the cost of claims from the following sources:

- Funds available from previous premium collection, including any investment income accumulated.
- A \$10 billion Commonwealth guarantee as set out in the TCI Act (separate guarantees apply for cyclone and terrorism risk).
- Additional funds through Ministerial Direction. In the event of a large-scale event, ARPC is required to inform the Responsible Minister, and, after Cabinet consultation, the Responsible Minister may determine an additional amount that becomes an appropriation.

The cyclone pool does not purchase retrocession. To meet its objectives of minimising premiums for high-cyclone risk policyholders, the cyclone pool seeks to minimise its overall cost base. Purchasing retrocession introduces margins to the cost base for the cyclone pool and these costs would need to be passed onto policyholders.

ARPC's approach to capital management and the flow of funds between the cyclone pool and the terrorism pool are based on the following principles:

- The financial positions and performance of the two pools are managed and measured separately.
- Inter-pool transfers may be considered. Any funds transferred between pools will be repaid over an appropriate time horizon.
- Capital management is considered over a long-term horizon, incorporating management actions that are responsive to cyclone pool objectives. Management actions balance the desire for premium stability with the responsibility to manage the cyclone pool in a sustainable manner. Management actions also consider the nature of the incident giving rise to the capital event along with the current and forecast financial outlook for each pool.

The cyclone pool premium rates have been set to be cost-neutral over the long-term, and as a result, it is expected that cumulative premiums will equal cumulative claims plus operating expenses. However, due to the high levels of volatility in cyclone activity, the cyclone pool is expected to either accumulate assets or be in deficit over the short and medium term.

In ARPC's Capital Management Plan, the cyclone pool net assets³⁴ target reflects the Board's appetite to call on the Commonwealth guarantee and is set to cover a one in 20-year level of losses over a year, equivalent to a 95 per cent probability of sufficiency. Net asset position outside the target range may result in management action.

8.2 Capital position of the cyclone pool

As at 30 June 2023, the cyclone pool has a small accumulation of capital, with net assets of \$43.0 million. The small build-up of assets is due to lower-than-expected cyclone losses during the 2022-23 cyclone season.

³⁴ Net assets are defined as assets less liabilities, excluding any repayment obligations for calls made on the Commonwealth guarantee.

8.3 Liquidity management

ARPC's investment objectives are low investment risk and low portfolio volatility, and to match asset cash flows to claim obligations. Large cyclone events may occur at any point during the cyclone season (November to April). ARPC aims to have 60 per cent of its assets available to be liquidated within 30 days to meet potential cashflow requirements. ARPC has also documented, and in principle agreed with Treasury, the process by which it can call upon the Commonwealth guarantee to minimise any impact on ARPC's ability to meet financial obligations when accessing these funds.

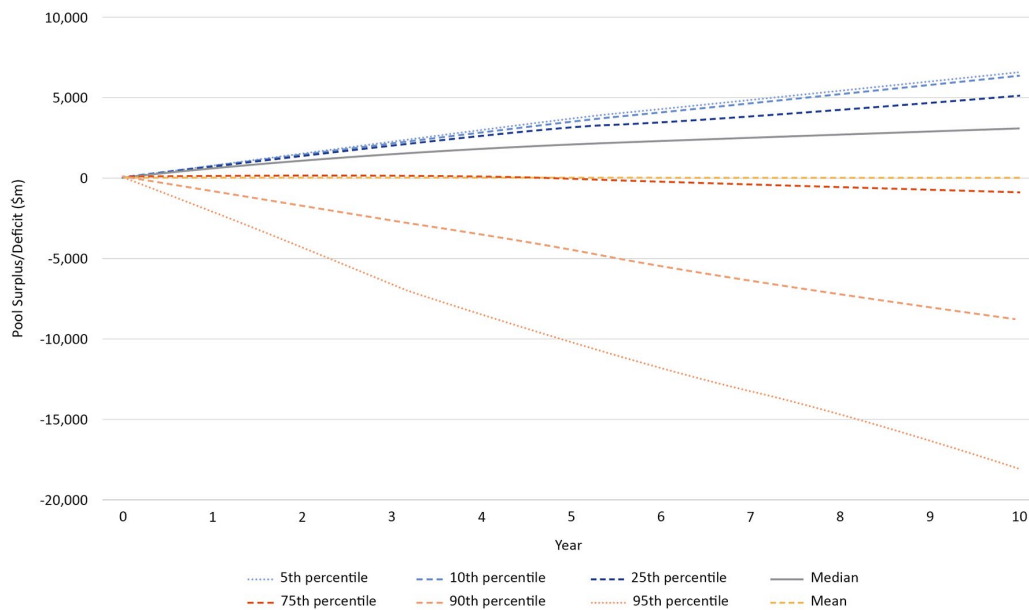
The *Public Governance, Performance, and Accountability Act 2013* (PGPA Act) restricts the investment assets of public financial corporations to cash and cash deposits, and government and semi-government securities. Thus, ARPC's investment portfolio comprises only low-risk, highly liquid assets. The investment policy allows for cyclone pool premiums to be invested in government bonds (30-50 per cent), term deposits (45-65 per cent), and cash (five per cent), reflecting the legislative requirements and investment objective to minimise investment losses. Expected cashflows are modelled to inform reinvestment decisions. The cashflow modelling considers the expected payment patterns of known events and potential future events. The liquidity strategy is consistent with the capital management objective of maximising the probability of having assets available to meet financial obligations where possible.

8.4 Steady state projections

Once all insurers with more than \$10 million GWP of eligible policies have joined at the end of the 2024 calendar year, the cyclone pool will reach a steady state in terms of exposure; changes to insurance take-up rates and new dwelling growth notwithstanding. Given the volatile nature of cyclone loss experience, the potential financial outcomes for the cyclone pool over the long-term vary considerably. Catastrophe model event sets have been used to simulate claims cost for numerous years, and the resulting surplus or deficit of the cyclone pool over time.

The 'funnel' of financial outcomes shown in Figure 8.1 represents the probability distribution of the cyclone pool's cumulative surplus/deficit position over the long-term. These simulations make the following assumptions:

- The starting capital position used is \$43.0 million, which reflects the cyclone pool's position as at 30 June 2023.
- The cyclone pool is at a steady state level of exposure.
- The simulations do not allow for any management actions.
- Premium rates are equal to estimated claims cost plus operating expenses such that the cyclone pool is cost-neutral to the government in the long-term.
- Investment income is set to zero. Investment income could become material if the cyclone pool builds up a significant level of assets. Therefore, Action 2 of this report is for ARPC to consider how investment income could be used to support cyclone pool objectives.

Figure 8.1 – Distribution of financial outcomes for the cyclone pool over 10-year time horizon

After 10 years, the cyclone pool has:

- an average balance equal to its starting cumulative surplus position (\$43.0 million), reflecting the long-term cost-neutrality of premiums (the “mean” line)
- 50 per cent chance of a \$3 billion surplus or more (the “median” line, with 50 per cent of outcomes being better than this line and 50 per cent being worse)
- 25 per cent chance of a \$5 billion surplus or more (the 5th, 10th and 25th percentile lines are all above this level)
- 25 per cent chance of a deficit
- 10 per cent chance of a \$8.5 billion deficit or worse
- Five per cent chance of a \$18 billion deficit or worse

Thus, at any time, there is about one chance in four of the cyclone pool having a cumulative deficit and three chances in four of there being a cumulative surplus. It is appropriate that ARPC’s Capital Management Plan recognises the wide range of potential financial outcomes for the cyclone pool and does not require management in response to small surpluses or deficits.

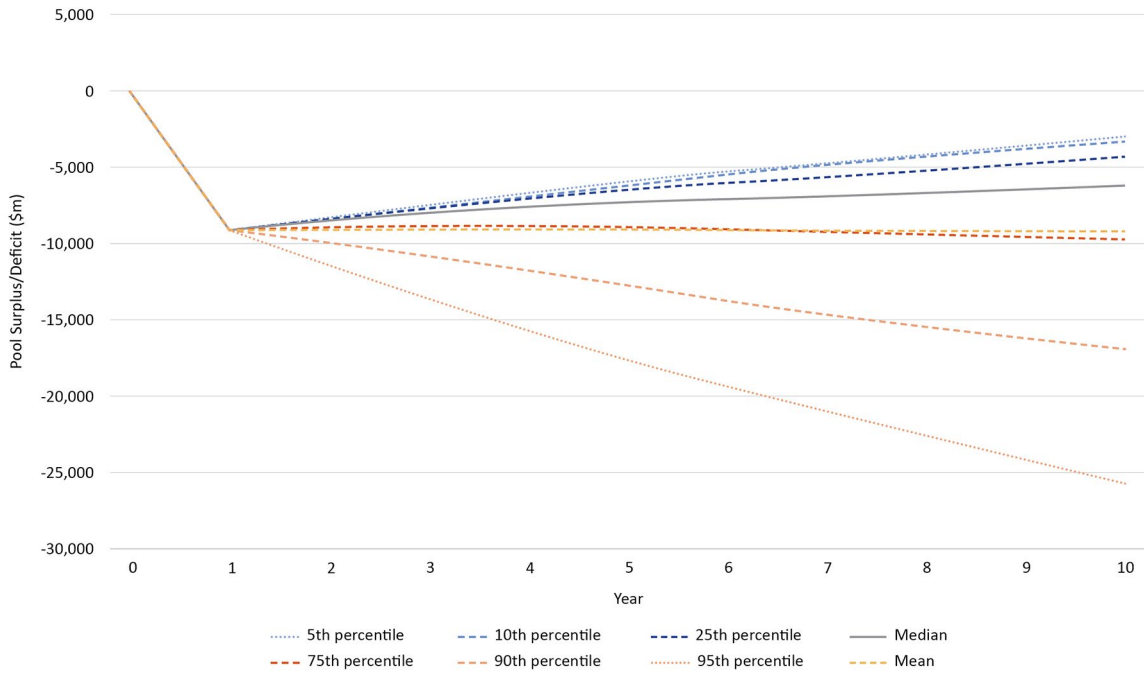
The potential financial outcomes for the cyclone pool are highly variable. After 10 years, there is a 25 per cent chance of a surplus more than \$5 billion and 10 per cent chance of a deficit in excess of \$8.5 billion.

8.5 Stress and scenario testing

8.5.1 Scenario 1: \$10 billion cyclone event in first year

An extreme cyclone event, or series of events, could lead to a material deficit for the cyclone pool, which would require calling on the Commonwealth guarantee. Figure 8.2 shows the distribution of financial outcomes if there were a \$10 billion cyclone event in the coming year. The probability of 10 billion of losses in the coming year is approximately 1.3 per cent.

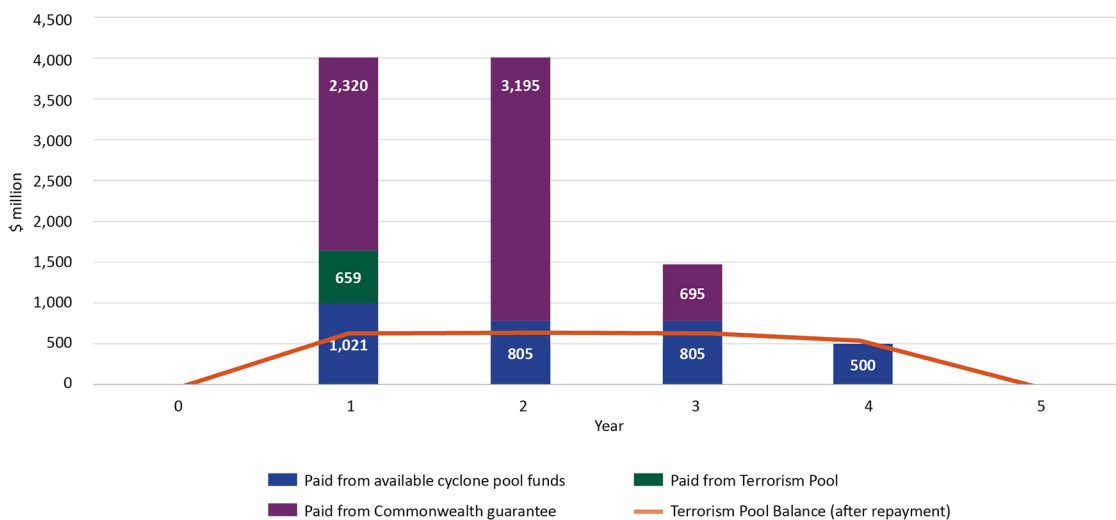
Figure 8.2 – Distribution of financial outcomes for the cyclone pool given a \$10 billion event in year one



This scenario would require a substantial call on the guarantee alongside using available assets from both the cyclone and terrorism pools. From the distribution of outcomes, it is evident that even with modest claims experience, there is very little chance of the cyclone pool recovering to a net zero position within 10 years.

Under ARPC’s Capital Management Policy, assets from both pools (above the minimum thresholds) can be used to pay claims before the Commonwealth guarantee is called upon. Figure 8.3 shows an example of how the inter-pool transfer mechanism is used to pay off a \$10 billion event occurring in the cyclone season 2023-24. The starting asset position for the terrorism pool as at 30 June 2023 is \$910 million (with minimum capital of \$250 million).

Figure 8.3 – Claims payments by funding source given a \$10 billion event in year one



As shown in Figure 8.3, funding is required from all three sources to pay claims in the first year. The payment pattern has been selected using experience from large historical cyclone events and assumes that 40 per cent of claims are paid in each of the first two years following an event with the remaining 20 per cent paid across the third and fourth years. Available funds from the terrorism pool are drawn down to the minimum available asset amount. There is a call on the guarantee of approximately \$2.3 billion in year one and \$3.2 billion in year two. In this example (which assumes no future claims experience and no management actions), the terrorism pool is fully repaid by year five.

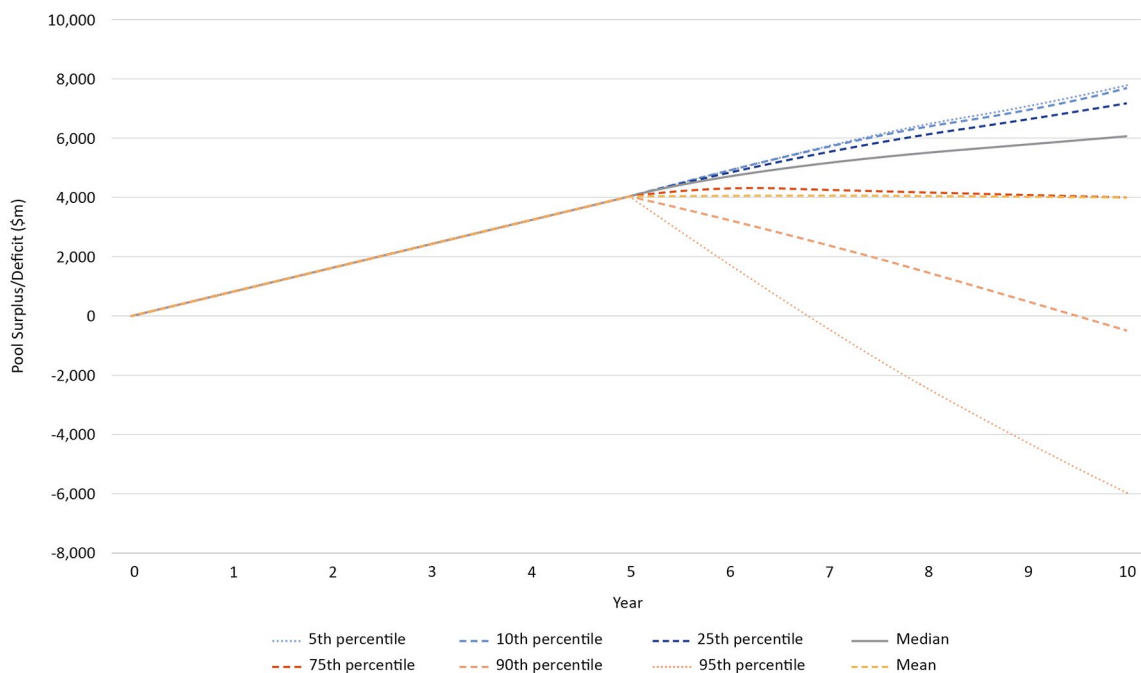
The mechanism for inter-pool transfers is consistent with ARPC’s objective to have assets available to meet claim obligations where possible and to reduce the probability of calls on the Commonwealth guarantee. The cyclone pool is expected to be able to pay back the terrorism pool and therefore this mechanism does not negatively impact the financial position of the terrorism pool. ARPC should consider the real probability of a significant event occurring in any year when managing the build-up of any potential surplus.

Large events in the initial years of the cyclone pool’s operations will require inter-pool transfers from the terrorism pool and calls on the Commonwealth guarantee.

8.5.2 Scenario 2: No cyclones for five years

Some level of cyclone losses is expected in every year. The median modelled claims cost is lower than the target premium pool due to the skew of the claims cost distribution, so it is expected that the cyclone pool will accumulate assets in most years and pay out claims in excess of premium in some years. Figure 8.4 considers a scenario where the cyclone pool has no further claims for the next five years, resulting in a \$3.8 billion surplus. The probability of the cyclone pool accumulating more than a \$3 billion surplus after five years is approximately 27 per cent. There is approximately a 10 per cent chance that the cyclone pool will return to a net zero position by its tenth year under this scenario in the absence of management actions.

Figure 8.4 – Distribution of financial outcomes for the cyclone pool given no events



Low cyclone activity across multiple years of operation could lead to the build-up of a material net-asset surplus.

The median outcome in this scenario is an accumulation of more than \$5 billion in assets after 10 years. In this scenario, investment income for the cyclone pool is expected to be material. The Initial Premium Review has not allowed for investment income, and as discussed in Section 4.2 and Action 2, ARPC will consider how investment income could be used where there is a material build-up of assets to support the cyclone pool's objectives.

In determining appropriate management actions as a result of material deficits or surpluses, ARPC will engage with Treasury and the Responsible Minister. The objective of cost-neutrality over the long-term will need to be balanced with the objective of improving insurance affordability and availability in high-risk regions. It is important to note that 'longer-term' for cost-neutrality is not defined in the TCI Act because an appropriate time may depend on the capital position of the cyclone pool.

ARPC's approach to capital management is appropriate for a portfolio with significant volatility and the backing of the Commonwealth guarantee. ARPC should expect to accumulate assets or be in deficit positions over the medium term and the target range in the Capital Management Policy is consistent with this expectation.



Appendix A: Data

The analysis in this report relies on data supplied to ARPC by insurers who have joined the cyclone pool, modelling data from the Initial Pricing Review, publicly available data sources, and data licensed by ARPC.

All reporting on financial performance for the 2022-23 financial year has been completed using data as at 30 June 2023. Analysis of the cyclone pool's exposure and projections into the future have included data as at 1 July 2023 to improve the accuracy of forward looking estimates (noting the significant number of insurers joining the cyclone pool on 1 July 2023).

Data sources	Description
ARPC data	
Financial statements	ARPC's financial statements including trial balance by account.
Insurer data submissions	
Unexpired Risk Transfer Report, Quarterly Movement Report, Policy Level Claims Report	<p>Datasets provided by insurers when transferring in-force risks to the cyclone pool, and thereafter on a quarterly basis.</p> <p>Policy datasets contain a record for each risk to be ceded to the cyclone pool. Data fields include:</p> <ul style="list-style-type: none"> • Unique location identifier • Exposure period • Location • Rating information including class of business, sums insured, excess, building characteristics, and policy coverage • Transaction information • Annual ARPC reinsurance premium • ARPC reinsurance premium owing for the remaining time on risk <p>Claims datasets contain a record for each claim with incurred cost recoverable from the cyclone pool. Data fields include:</p> <ul style="list-style-type: none"> • Cyclone event designation • Location • Date and time of loss • Claim status • Claim description • Paid to date and case estimates
Pricing data	
Exposure Data Module, G-NAF technical rates	<p>Exposure Data Module (aggregated and de-identified). Data fields include:</p> <ul style="list-style-type: none"> • Location (aggregated) • Sums insured

	<ul style="list-style-type: none"> • Building characteristics such as construction type • Policy characteristics such as class of business and coverage <p>G-NAF technical rates (cost per sum insured) for Wind, Flood and Surge developed during the Initial Pricing Review.</p>
Catastrophe model data	
COMBUS catastrophe model event loss table, RMS catastrophe model event loss table	Event loss tables with probability of event occurring and cost given the event occurs modelled using the Exposure Data Module.
Historical loss data	
Insurance Council of Australia Historical Catastrophe List, Bureau of Meteorology Tropical Cyclone report database, Callaghan paper cyclone list	<p>List of catastrophes and associated costs reported by insurers to the Insurance Council of Australia, normalised to allow for growth in the number of dwellings and inflation.</p> <p>List of tropical cyclones names by the Bureau of Meteorology and captured in the Callaghan paper from historical newspaper sources.</p>
Economic data	
Consumer Price Index (Australian Bureau of Statistics), RBA Statement of Monetary Policy Forecast (August 2023), Federal Treasury Budget Forecast (May 2023)	Historical and forecast inflation information. Discount rates for insurance liabilities.
Other external data	
G-NAF datasets	List of all G-NAFs in Australia, geocoded locations and address fields.
Finity Consulting online quote data	Dataset of quotes returned by online insurer quoting engines for a given set of policy characteristics.

Appendix B: Approach

Approach to projecting cyclone pool premium

In the Initial Pricing Review, the overall target premium pool was set to be equal to modelled cyclone pool cost³⁵ to meet the objective of long-term cost-neutrality. Future premiums have been projected assuming that once all insurers have joined the cyclone pool, total premiums will be consistent with the target premium pool (allowing for inflation and exposure growth).

All large insurers have indicated that they will join the cyclone pool by the end of the 2023 calendar year, as discussed in Section 3.2.1. Several small insurers will join the cyclone pool over the course of the 2024 calendar year.

The premium income for the next three financial years has been projected using assumptions about the timing of insurers joining the cyclone pool, sum insured inflation and growth in dwellings. The assumptions are shown in Table B.1 and Table B.2.

Table B.1 – Projected proportion of cyclone pool exposure joined over time

Quarter	Proportion of cyclone pool exposure joined
Sep-23	68%
Dec-23	94%
Mar-24	95%
Jun-24	96%
Sep-24	98%
Dec-24	100%

After the December 2023 quarter, ARPC estimates that the exposure, as a proportion of ultimate pool exposure (as estimated in the Initial Pricing Review), will be 94 per cent.

Table B.2 – Inflation assumptions

Sum insured inflation to Jun23 (p.a.)	9.3%
Future sum insured inflation (p.a.)	4.0%
Growth in dwellings (p.a.)	2.0%

The premium pool is projected to increase over time in line with sum insured inflation, as premiums are charged as a base rate multiplied by sum insured. The sum insured inflation assumption to 30 June 2023 is comparable to inflation observed when comparing average sums insured for Home Buildings as at 30 June 2023 with those assumed in the Initial Pricing Review. The projection assumes that sum insured inflation will level at four per cent after 30 June 2023. The target premium pool will also increase as new properties are built and insured. The projection assumes that there will be dwelling growth of two per cent per year based on the historical net growth of buildings.

³⁵ The modelled cyclone pool cost is equal to the Annual Average Loss (AAL) from cyclone events, plus allowances for eligible insurer claims handling expenses and ARPC's operating expenses.

Approach to projecting claims cost

Catastrophic natural perils are difficult to model using historical experience due to the volatile nature of losses and the relatively short historical experience available. ARPC has therefore relied on catastrophe models which simulate events and model the damage to physical assets to estimate the AAL.

Key steps undertaken by ARPC to determine the AAL in the Initial Pricing Review:

- Develop an Australia-wide exposure dataset that covers all properties across Australia. This includes information on property value and construction characteristics (e.g. type of roof, year of construction).
- A range of market leading catastrophe models were licensed to model losses from cyclone and cyclone related flooding. The following models were used by peril:
 - Wind risk: Risk Management Solutions (RMS), Risk Frontiers, COMBUS
 - Fluvial flooding: Aon Combined Hazard Information Platform (CHIP), COMBUS, Finperils/JBA
 - Storm surge: Aon CHIP, COMBUS, Finperils.
- The catastrophe models were run over the exposure dataset and the model results were blended to estimate the expected AAL.

Two key assumptions underlying the use of catastrophe model outputs are described below:

- **Event cap:** The AAL estimated by catastrophe models is materially influenced by the most extreme events in the model event sets. There is significant uncertainty associated with these events, and to avoid pricing for this uncertainty, an event cap was considered appropriate. Capping extreme events from catastrophe models for volatile natural perils is consistent with standard practice in the (re)insurance industry.

Extreme events were capped at \$15 billion. \$15 billion is twice the normalised cost of TC Tracy (1974), and similar to the average cost of a category 2 cyclone crossing the coast at Brisbane. This is a key assumption in the AAL estimation process that decreased modelled claims costs by approximately 15 per cent. The \$15 billion cap is implicitly indexed over time in line with sum insured inflation.

- **Cyclone-related flood:** The cyclone pool covers flooding caused by cyclone events. Flood is treated as a separate peril by available models, which are agnostic to the weather system that caused it. Therefore, to estimate the cost of claims arising from cyclone-related flooding, ARPC commissioned Risk Frontiers to research the historical flood costs caused by cyclone events. This research^{36, 37} was used to set assumptions for the proportion of flood cost that would be covered by the cyclone pool for different areas in Australia. These assumptions, plus assumptions about the rate of insurance take-up for flood (as the cyclone pool follows the terms of the underlying insurance policy), drive the size of the flood AAL for the cyclone pool.

³⁶ Risk Frontiers – Literature Review of Historical Tropical Cyclone that Generated Insured Losses, January 2022

³⁷ Risk Frontiers – Flood related to Tropical Cyclone, January 2022



Appendix C: Glossary

Term	Definition
Average Annual Loss (AAL)	The Average Annual Loss is the estimated average loss over a year for the cyclone pool. This amount includes recoveries paid to insurers for eligible claims but does not include claims handling expenses and ARPC operating expenses.
Case estimates	The insurer's estimate of total payments to be made for outstanding reported claims. Each claim is individually assessed.
Catastrophe models	A model that simulates catastrophic events to estimate potential losses.
Category 1-5 (tropical cyclone)	Tropical cyclone intensity scale based on maximum mean wind speed, with 1 representing the lowest severity and 5 representing the highest severity.
Claims leakage	The difference between what an insurer spent to settle a claim versus the amount that should have paid in a genuine, efficient transaction.
COMBUS	Catastrophe modelling organisation
CRESTA	CRESTA (Catastrophe Risk Evaluating and Standardising Target Accumulations) zones are part of an international geographic zoning system which helps brokers and reinsurers manage natural hazard risk.
DCE	Declared Cyclone Event
Earned premium	The portion of a policy's written premium that is earned based on time elapsed since the policy effective date and a pattern of risk over the policy term.
ENSO	The El Niño Southern Oscillation is a climate pattern that describes the behaviour of surface water temperatures in the tropical Pacific Ocean.
Cyclone related flooding	Cyclone related flooding can be split into two broad categories: <ul style="list-style-type: none"> • Pluvial flooding (incorporating surface flooding and flash flooding) which can occur anywhere high rainfall occurs, such as the path of a cyclone. • Fluvial flooding (riverine) occurs when water in a river, lake or other water body overflows onto the surrounding banks and land.
FOR	Financial Outlook Report
G-NAF	The Geoscape Geocoded National Address File is a dataset that contains all physical addresses in Australia.
GWP	Gross Written Premium
Home	A standalone residential property that is not a Strata policy.
IBNR	Incurred But Not Reported claims are claims that have taken place but have not yet been reported to the insurer.
ICA	Insurance Council Australia
Indian Ocean Dipole (IOD)	A weather pattern defined by the difference in sea surface temperature between the western Indian Ocean and the eastern Indian Ocean.
Incurred claims cost (ultimate)	The total projected claims cost comprising of paid to date, outstanding amounts and IBNR.
Initial Premium Rates	The premium rates determined in the 2022 Initial Pricing Review.
Initial Pricing Review	The first pricing review effective 1 October 2022.
Insurance take-up / non-insurance	A rate representing the number of insured/non-insured households as a proportion of households eligible for insurance cover.
Loss Ratio	Total claims costs divided by total premiums.



Modelled cyclone pool cost	The estimated AAL calculated in the Initial Pricing Review plus an allowance for ARPC's operating expenses and eligible insurer claims handling expense.
NEMA	National Emergency Management Agency
Net assets	Assets less liabilities, excluding any repayment obligations for calls made on the Commonwealth guarantee.
Premium adequacy / ratio	Premium adequacy refers to the sufficiency of premiums to cover potential claims and expenses. The premium adequacy ratio is the total premiums divided by the modelled cyclone pool claims cost.
Probability of exceedance	The likelihood that a particular event or value will exceed a certain threshold or level.
Probability of sufficiency	The likelihood that capital or liabilities will be sufficient to cover obligations.
Rateable sum insured	The insured value of a property defined by ARPC and used to calculate the ARPC reinsurance premium.
Residential	Refers to a policy where the property is used wholly or mainly for residential purposes.
Retention	The amount retained by a reinsured after placing reinsurance.
Retrocession	Reinsurance purchased by reinsurance companies. Reinsurers retrocede risks to other reinsurers as a means of risk management.
Retrofit	Refers to the process of making improvements or upgrades to an existing home.
Return period	A recurrence interval used to estimate the likelihood of a specific event occurring within a given period of time.
Risk Frontiers	Catastrophe modelling organisation
Risk Management Solutions (RMS)	Catastrophe modelling organisation
Risk mitigation	An action or measure taken to reduce risk.
Scenario testing	A forecasting technique where hypothetical scenarios are created to assess the potential outcomes and impacts of various events.
SME	Refers to a policy where the property is used mainly for residential purposes and is not classified as Strata.
Storm surge / coastal inundation	An abnormal rise in sea level over and above the normal (astronomical) tide levels, commonly associated with a low pressure system such as cyclones.
Strata	Refer to the definitions set out in items 4A (1) and (2), (3), or (4) of the Terrorism Insurance Amendment Regulations.
Target premium pool	The premium rates are intended to achieve an overall target premium pool which meets the expected cost of claims, claims handling expenses and pool operational costs.
TC	Tropical Cyclone
TCI Act	<i>Terrorism and Cyclone Insurance Act 2003</i>
Total loss	A total loss occurs where the cost to rebuild or repair the property exceeds the sum insured.
Underinsurance	Refers to when a policyholder's insurance coverage (sum insured) does not fully cover their financial loss in the event of a claim.
Wind / Flood / Surge Risk Band	ARPC determined risk bands by peril used to set premiums, indicating a relative level of risk.
Written premium	The total premium that a policyholder is required to pay for a policy.



Appendix D: Letter of Advice – Reviewing Actuary



Australian Government
Australian Government Actuary

Telephone: 02 6263 4127
E-mail: guy.thorburn@aga.gov.au

13 October 2023

Dr Chris Wallace
Chief Executive Officer
Australian Reinsurance Pool Corporation
Gadigal Country,
PO Box Q1432 Queen Victoria Building,
New South Wales, 1230

Dear Chris

JUNE 2023 FINANCIAL OUTLOOK REPORT

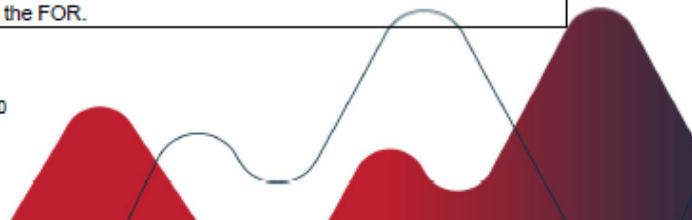
Section 40A of the *Terrorism and Cyclone Insurance Act 2003* (the Act) requires that the ARPC prepares a Financial Outlook Report (FOR) after the end of each financial year beginning on or after 1 July 2023. Whilst the Act does not require a FOR to be prepared at this time, the pool is reinsuring cyclone risks and a FOR provides a valuable opportunity to take stock of progress in the ongoing actuarial management of the pool. It is good practice to prepare the first of these reports at this time.

Subsection 33B(1)b of the Act requires that the Reviewing Actuary review each FOR prepared under the Act and report to the Board on my findings. I have been asked by the ARPC to review this FOR as though it was prepared under the Act. I am therefore writing as the Reviewing Actuary of the ARPC to summarise my review of the 30 June 2023 FOR.

Summary of key findings

- The FOR addresses the key areas set out in section 5E of the Regulations. The report assesses premiums, provides projections of outcomes and observations on capital management and risks facing the pool. As claims data matures the report could more directly assess the reserves held by the cyclone pool. It is important that the report sets out actions to enhance the pool's ability to meet its objectives in the long term.
- The net assets of the pool are within a range of reasonably probable outcomes. However, as the Board is aware, a cyclone can rapidly deplete any assets that build up.
- Inflation and climate change present two key risks. It is important that their impacts on the pool are actively managed.
- The 2022 pricing review established premiums that were consistent with the pool's legislative objectives. The limited claims experience to date does not further inform the adequacy of premiums. However, the pooling inherent in the premium structure can be monitored. Emerging pool exposure is tested against premium assumptions.
- SME and Strata premiums do not reflect property level mitigation. Further work is proposed in this area.
- I concur with the actions set out in the FOR.

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Financial Outlook Report

Section 5E of the *Terrorism and Cyclone Insurance Regulations 2003* (the Regulations) sets out the minimum content that is required to be included in the FOR. This states that a Financial Outlook Report must include:

- a) an overview of the performance of the cyclone reinsurance scheme during the financial year;
- b) observations on broader financial risks affecting the scheme's financial outlook;
- c) an assessment of the adequacy of:
 - i) the premiums the Corporation is receiving under cyclone reinsurance contracts; and
 - ii) the Corporation's reserves that are available to meet claims under those contracts;
- d) observations on capital management for the purposes of the scheme;
- e) projections for financial outcomes for the scheme, based on estimates of future claims under cyclone reinsurance contracts;
- f) any other matters that the Corporation considers material to the current and future financial situation of the scheme.

Information Received

To complete this review, I have been provided with [1] a draft of the Financial Outlook Report on 5 October 2023; [2] the models used to determine outstanding claims provisions; [3] output from the models used to derive the projected asset positions of the pool; and [4] the ARPC Capital Management Plan. I have also discussed elements of the FOR with the ARPC actuarial team.

I have relied on this information for the purpose of this review.

Review of the Financial Outlook Report

Overview of the performance of the scheme during the financial year

Section 3 of the FOR provides an overview of the performance of the Scheme during 2022-23.

Four insurers joined the pool in 2022-23. Four cyclones were declared. Two of these cyclones occurred after the insurers had joined. The losses from these two cyclones have been minimal and they are not expected to materially increase. The low level of claims to date differs to the expected level of claims on a modelled basis. However, this is not surprising as expectations are set over a long-term horizon. The pool has built up a modest (relative to the longer-term risk) level of assets as at 30 June 2023. These assets are sufficient to fund the outstanding claims provision arising from the cyclone events to date. These provisions are estimated in line with accepted actuarial methods.

All large insurers will join the pool by 30 November 2023. This will result in over 90% of the ultimate cyclone pool exposure being covered by that time. Claims are therefore expected to be significantly larger during the 2023-24 cyclone season.

Observations on the financial risks facing the scheme

Section 5 focusses on broader financial risks affecting the financial outlook of the pool.

[https://austreasury.sharepoint.com/sites/ap-function/arpc/Financial Outlook Report/ARPC FOR Peer Review Summary FINAL01.docx](https://austreasury.sharepoint.com/sites/ap-function/arpc/Financial%20Outlook%20Report/ARPC%20FOR%20Peer%20Review%20Summary%20FINAL01.docx)



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The clearest financial risk facing the pool is that of a severe cyclone, or series of cyclones, over insured areas. The impact of extreme events cannot be downplayed. As the FOR states, "Cyclone risk is highly volatile, with the potential for low probability high severity events to occur in any given year". The pool has mechanisms in place to respond through the Commonwealth guarantee, and associated provisions relating to its reinstatement and potential extension.

Inflation, climate change and alignment with insurers' claims management are also considered in the FOR.

- Recent high inflation may result in policyholders reducing their level of insurance cover. Underinsurance can result in a higher claims ratio for non-total losses. This risk is addressed when assessing the adequacy of premiums.
- Climate change is expected to change the profile of the risks reinsured by the pool. The pool will need to adapt to this changing environment over time. The exact changes are, however, uncertain. ARPC will action this risk through scenario testing, to understand the emerging risks and their potential impact upon the pool. I concur with this action.
- There is uncertainty regarding the impacts of moving to an El Nino phase. One of the objectives of the pool was to bring greater stability to premiums, where possible. Consequently, premiums are set on a long-term view of weather cycles. It is not recommended to alter premiums to follow shorter term trends. This is consistent with the policy objectives of the pool.
- Section 6 also speaks to the lack of a direct financial incentive for insurers to reduce the claims cost arising from cyclones as 100% of the risk resides with the pool. ARPC is seeking to mitigate this risk through claims auditing.

Assessment of the adequacy of premiums

Section 6 provides an assessment of the adequacy of premiums.

In 2022 premiums were set that were consistent with the legislative objectives of the pool. There is limited new information to conclude differently. Four insurers joined by 30 June 2023. This provides some additional information relating to the exposure to cyclone risk, but this is not fully representative of the mix of risks that will ultimately be reinsured. Claims experience to date does not further inform the adequacy of premiums.

The FOR sets out four topics to be actioned in future pricing reviews. I concur with these actions.

1. The appropriateness of the pooling inherent in the premium structure is to be monitored. The pooling within the premium structure was considered appropriate to meet the objectives of the pool. The sustainability of the current arrangement depends on the mix of risks reinsured by the pool. Differences observed to date may be due to the sequencing of insurers joining the pool. Although I do not consider that the net result of this emerging mix of business presents a material risk to the pool at 30 June 2023, it will require monitoring over time.

[https://austreasury.sharepoint.com/sites/ap-function/arpofinancial Outlook Report/ARPC FOR Peer Review Summary FINAL01.docx](https://austreasury.sharepoint.com/sites/ap-function/arpofinancial%20outlook%20report/ARPC%20FOR%20Peer%20Review%20Summary%20FINAL01.docx)



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2. The need for monitoring extends to new builds and insurance take up rates. For example, if there are disproportionately more new builds in high-risk areas, then this would challenge the current pooling arrangements.
3. The FOR discusses risks associated with recent inflation. This may impact the adequacy of premiums over the short term, but in ARPC's view, should be reflected in higher sums insured in the long term. The report notes that this will be monitored over time.
4. The cyclone pool is required to incentivise risk mitigation. It does this through the premium discounts for mitigation for home insurance. The FOR notes positive responses from insurers in this aspect, with several insurers advising that they will be adding mitigation questions to their underwriting process. However, there are gaps in the premium rates: [1] ARPC are yet to develop mitigation discounts for SME and Strata policies; and [2] there is no penalty in the rating process for unknown risk factors when data is not collected by insurers. The FOR sets out that this will be addressed over the next two to three years.

I concur with the actions set out in the FOR to consider how investment income can support the objectives of the pool. Material investment income will only exist when assets have accumulated. I would encourage this work to think broadly about the potential benefits of applying this to activities that benefit the long-term sustainability of the pool. This could include encouraging more resilient properties and risk mitigation activities. If this identified activities that are outside ARPC's current scope, I would encourage raising those opportunities as part of the 2025 review.

The premium adequacy in this FOR is based on claims modelling conducted as part of the 2022 premium review. This FOR is primarily illustrating the effects of different mixes of risk. Future FOR's will need to progressively update claims modelling over time.

Assessment of the adequacy of the reserves

Section 7 sets out the outstanding claims liability and discusses the uncertainty inherent in this estimate. The inevitable uncertainty in the limited claims experience to date make it difficult to provide a fuller assessment of these liabilities. I expect this capability will improve as experience matures. Having said that, as cyclone events to date are expected to generate few claims, there is little risk to the current financial outlook of the CRP from the adequacy of outstanding claims provisions.

I do observe that estimates of ultimate claims costs are informed by modelled cyclones with similar characteristics. This is an acknowledged source of uncertainty. The applicability of commercial catastrophe models to reserve estimation should continue to be monitored. ARPC could consider if further model refinement could assist the reserving process by focussing on loss distributions from the actual cyclone events as they occur.

The use of modelled cyclones to determine risk margins appears to have a degree of conservatism for recent claims. However, I do not consider any conservatism in the risk margins to be material in the context of the pool at 30 June 2023.

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