North Dakota Teachers' Fund for Retirement
Plan Management Policy

I. Plan Management Policy Overview

The North Dakota Teachers' Fund for Retirement (TFFR) Plan Management Policy is a risk assessment and management tool that monitors the ongoing health of TFFR using the most recent actuarial valuation results and stochastic projections. The objective of the Plan Management Policy is to provide a basis for balancing the Fund's obligations with current assets and expected future contributions in order to maintain its long-term health and viability. The Policy also provides a framework that the Board can follow in establishing metrics for future funding and benefit changes. The Plan Management Policy is based upon metrics and a scoring system that were established at the July 24, 2019 Board meeting. The Plan Management Policy Score will be updated subsequent to each annual actuarial valuation.

II. Background

The Plan Management Policy is different from the Funding Policy. The Funding Policy sets parameters for the determination of the actuarially determined contribution (ADC) as of each actuarial valuation date. The Plan Management Policy establishes the parameters for a forward-looking assessment of TFFR.

An ADC is used as a benchmark to compare to the statutory contribution rate. An ADC reflects an asset valuation method (i.e., smoothing method), actuarial cost method (e.g., entry age normal), and amortization method for paying down unfunded liabilities or recognizing surplus assets. A description of the ADC is contained in a separate document ("Actuarial Funding Policy Statement"). In summary, the current TFFR funding policy relies on an ADC that is equal to the sum of (a) the employer normal cost rate and (b) the level percentage of pay required to amortize the unfunded actuarial accrued liability over the 30-year closed period that began July 1, 2013 (24 years remaining as of July 1, 2019).

III. Risk Assessment and Management

The Plan Management Policy is a risk assessment tool. The risks facing TFFR can be broadly classified into three categories: risks related to economic variables, risks related to demographic events, and risks related to external forces. An overview of the primary risks facing TFFR stakeholders follows.

Risks related to economic variables:

- Investment return – the risk that actual returns will be different than expected and more volatile than desired.
- Inflation (price inflation, wage inflation) – the risk that measures of inflation will be inconsistent with other economic measures.

Risks related to demographic events:

- Mortality/longevity – the risk that participants will live longer than expected
- Payroll and/or population growth – the risk that aggregate payroll will increase at a rate less than expected. This is relevant since contributions to TFFR are collected as a percentage of member payroll.

- Retirement/disability/termination experience – the risk that members leave active service in a manner than generates actuarial gains or losses relative to the assumptions.

There are even risks related to external forces (e.g., governance risk, regulatory risk, litigation risk, political risk), but these risks are difficult – or impossible – to manage.

The Plan Management Policy is a tool that measures investment return risk, since investment return risk has the most significant impact on TFFR's long term financial health.

IV. Scoring System Metrics

The scoring system metrics that will be monitored on a periodic basis are:

- ➢ *The current funded ratio*: This is equal to the ratio of the market value of assets to the actuarial accrued liability as of the latest actuarial valuation date. The purpose of this metric is to assess the current funded status of TFFR.
- ➢ *The downside funded ratio as of July 1, 2030*: Based on stochastic projections, determine the probability that the funded ratio will be less than 65%. The purpose of this metric is to assess the likelihood of the funded ratio not improving over the short term. The lower the likelihood that the funded ratio will not increase, the higher the score.
- ➢ *The target funded ratio as of July 1, 2040*: Based on stochastic projections, determine whether the funded ratio is projected to increase above certain thresholds over a longer time horizon with 51% or more probability.
- ➢ *Improvement in the funded ratio over a 10-year period*: Based on stochastic projections, determine the probability that the funded ratio will improve by 5% over the following 10 years.
- ➢ *Ability to recover/withstand from a market downturn*: Based on stochastic projections, determine the probability that the funded ratio improves by 5% over 10 years following a market downturn. A market downturn is defined as a two-year period with a compound average return of -10% or worse.

V. Policy Score

The Policy Score is the sum of the points that have been assigned to each metric and can range from 0 to 14 and correspond to a color ranging from red to green. A higher score indicates better overall health of TFFR. The Policy Score is grouped into the following categories:

Color	Policy Score	Indication
Green	11 to 14	TFFR objectives are being met or likely to be met
Yellow	7 to 10	TFFR objectives may be met over a longer period
Orange	4 to 6	Continue to monitor TFFR
Red	0 to 3	Changes to TFFR should be considered

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14

VI. Policy Scoring System

Each metric is assigned a score based upon the results of the annual actuarial valuation and resulting analysis as follows:

Metric	Criteria	Score
The current funded ratio	• Funded ratio of 90% or higher • Funded ratio between 80% and 90% • Funded ratio between 70% and 80% • Funded ratio less than 70%	• +3 • +2 • +1 • +0
The downside funded ratio as of July 1, 2030	• Under 65% funded ratio with less than 20% probability • Under 65% funded ratio with less than 30% probability • Under 65% funded ratio with less than 40% probability • Under 65% funded ratio with more than 40% probability	• +3 • +2 • +1 • +0
The target funded ratio as of July 1, 2040	• 85% or higher with 51% or more probability • Between 80% and 85% with 51% or more probability • Between 75% and 80% with 51% or more probability • Between 70% and 75% with 51% or more probability • Not more than 70% with 51% or more probability	• +4 • +3 • +2 • +1 • +0
Improvement in the funded ratio over a 10-year period	• Funded ratio improves by +5% over 10 years with 66% probability • Funded ratio improves by +5% over 10 years with 50% probability • Funded ratio does not improve by +5% over 10 years with 50% probability	• +2 • +1 • +0
Ability to recover from or withstand a market downturn	• Funded ratio after downturn improves by +5% over 10 years with 50% probability • Funded ratio after downturn improves by +5% over 10 years with 33% probability • Funded ratio after downturn does not improve by +5% over 10 years with 33% probability	• +2 • +1 • +0

For purposes of scoring, probabilities and funded ratios will be rounded to the nearest whole percentage. For example, a probability of 49.6% would be rounded up to 50%.

VII. Outside Factors

Other factors outside of TFFR could have an effect on the directional trend of future Policy Scores. These factors include, but are not limited to:

- ➢ Projected economic conditions
- ➢ Market cycles
- ➢ North Dakota economy

TFFR Staff and the actuary will discuss the appropriate outside factors and determine whether these factors are expected to potentially improve or worsen the Policy Score.

VIII. Actuarial Assumptions

The actuarial assumptions used will be the same as those used for the annual actuarial valuation. The actuarial assumptions are described in detail in the actuarial valuation report. The funded ratio used in the plan management policy is based upon the market value of assets.

In order to stochastically model investment returns, Capital Market Assumptions are used. Capital Market Assumptions are developed by investment firms and represent expectations for future risk and returns for different asset classes. The Capital Market Assumptions used for the analysis are those published in the most recently available Horizon's Annual Survey of Capital Market Assumptions. If Horizon discontinues the publication of this survey, a suitable replacement or alternative will be used.
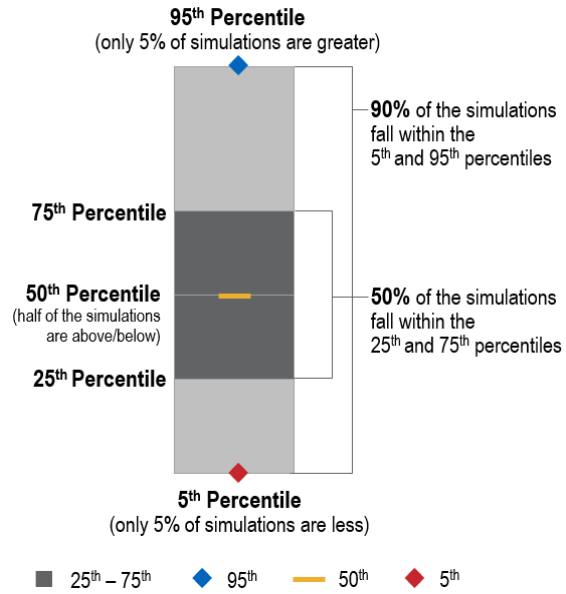
Projected liabilities are based upon an "open group" liability forecast. An open group projection generates projected populations for each future valuation date based on assumptions related to retirement, termination, salary increases, mortality, etc. New entrant records are generated to replace active members that decrement in the model in order to maintain a level active membership in the future. The profile of new entrants is based on recent demographics of new hires, subject to input from TFFR staff and Board.

IX. Stochastic Modeling

The Capital Market Assumptions are used with TFFR's target asset allocation in order to simulate 5,000 investment portfolio return scenarios, each simulation representing a 20-year period. The simulated investment returns, along with open group liability forecasts, are used to model the projected funded ratio. The results are grouped into percentiles and summarized as a range:

- ➢ **Best Case**: Better cases would occur only 5% of the time (above the 95th percentile in the example below)
- ➢ **Most Likely**: Better or worse cases (50th percentile) are equally likely
- ➢ **Worst Case**: Worse cases would occur only 5% of the time (below the 5th percentile in the example below)

Sample
Funded Ratio

95th Percentile
(only 5% of simulations are greater)

90% of the simulations
fall within the
5th and 95th percentiles

75th Percentile

50th Percentile
(half of the simulations
are above/below)

50% of the simulations
fall within the
25th and 75th percentiles

25th Percentile

5th Percentile
(only 5% of simulations are less)

| | 25th – 75th | | 95th | | 50th | | 5th |

TFFR Board Adopted: 01/23/2020