

Summary Prospectus

BlackRock Multi-State Municipal Series Trust | Investor A1 Shares

- **BlackRock Pennsylvania Municipal Bond Fund**

Investor A1: MDPYX

Before you invest, you may want to review the Fund's prospectus, which contains more information about the Fund and its risks. You can find the Fund's prospectus (including amendments and supplements), reports to shareholders and other information about the Fund, including the Fund's statement of additional information, online at <https://www.blackrock.com/prospectus>. You can also get this information at no cost by calling (800) 441-7762 or by sending an e-mail request to **prospectus.request@blackrock.com**, or from your financial professional. The Fund's prospectus and statement of additional information, both dated September 25, 2025, as amended and supplemented from time to time, are incorporated by reference into (legally made a part of) this Summary Prospectus.

This Summary Prospectus contains information you should know before investing, including information about risks. Please read it before you invest and keep it for future reference.

The Securities and Exchange Commission has not approved or disapproved these securities or passed upon the adequacy of this Summary Prospectus. Any representation to the contrary is a criminal offense.

Not FDIC Insured • May Lose Value • No Bank Guarantee

Summary Prospectus

Key Facts About BlackRock Pennsylvania Municipal Bond Fund

Investment Objective

The investment objective of BlackRock Pennsylvania Municipal Bond Fund (the “Pennsylvania Fund” or the “Fund”) is to provide shareholders with income exempt from Federal income tax and Pennsylvania personal income taxes.

Fees and Expenses of the Fund

This table describes the fees and expenses that you may pay if you buy, hold and sell shares of the Fund. **You may pay other fees, such as brokerage commissions and other fees to your financial professional or your selected securities dealer, broker, investment adviser, service provider or industry professional (including BlackRock Advisors, LLC (“BlackRock”) and its affiliates) (each a “Financial Intermediary”), which are not reflected in the table and example below.**

Shareholder Fees (fees paid directly from your investment)	Investor A1 Shares
Maximum Sales Charge (Load) Imposed on Purchases (as a percentage of offering price)	None ¹
Maximum Deferred Sales Charge (Load) (as a percentage of offering price or redemption proceeds, whichever is lower)	None ²
Annual Fund Operating Expenses (expenses that you pay each year as a percentage of the value of your investment)	Investor A1 Shares
Management Fee ³	0.52%
Distribution and/or Service (12b-1) Fees	0.10%
Other Expenses	0.22%
Miscellaneous Other Expenses	0.18%
Interest Expense	0.04%
Acquired Fund Fees and Expenses ⁴	0.01%
Total Annual Fund Operating Expenses ⁴	0.85%
Fee Waivers and/or Expense Reimbursements ^{3,5}	(0.16)%
Total Annual Fund Operating Expenses After Fee Waivers and/or Expense Reimbursements ^{3,5}	0.69%

¹ Investor A1 Shares are subject to a maximum sales charge on purchases of 4.00%. The sales charge does not apply to dividend and capital gain reinvestments by existing shareholders and new purchases for certain employer-sponsored retirement plans, which are currently the only investors who may invest in Investor A1 Shares.

² A contingent deferred sales charge (“CDSC”) of 1.00% is assessed on certain redemptions of Investor A1 Shares made within 18 months after purchase where no initial sales charge was paid at the time of purchase. The CDSC does not apply to redemptions by certain employer-sponsored retirement plans or to redemptions of shares acquired through reinvestment of dividends and capital gains by existing shareholders.

³ As described in the “Management of the Funds” section of the Fund’s prospectus beginning on page 53, BlackRock has contractually agreed to waive the management fee with respect to any portion of the Fund’s assets estimated to be attributable to investments in other equity and fixed-income mutual funds and exchange-traded funds managed by BlackRock or its affiliates that have a contractual management fee, through June 30, 2027. In addition, BlackRock has contractually agreed to waive its management fees by the amount of investment advisory fees the Fund pays to BlackRock indirectly through its investment in money market funds managed by BlackRock or its affiliates, through June 30, 2027. The contractual agreements may be terminated upon 90 days’ notice by a majority of the non-interested trustees of BlackRock Multi-State Municipal Series Trust or by a vote of a majority of the outstanding voting securities of the Fund.

⁴ The Total Annual Fund Operating Expenses do not correlate to the ratios of expenses to average net assets given in the Fund’s most recent Annual Financial Statements and Additional Information, which do not include Acquired Fund Fees and Expenses.

⁵ As described in the “Management of the Funds” section of the Fund’s prospectus beginning on page 53, BlackRock has contractually agreed to waive and/or reimburse fees or expenses in order to limit Total Annual Fund Operating Expenses After Fee Waivers and/or Expense Reimbursements (excluding Dividend Expense, Interest Expense, Acquired Fund Fees and Expenses and certain other Fund expenses) to 0.64% for Investor A1 Shares through June 30, 2027. The contractual agreements may be terminated upon 90 days’ notice by a majority of the non-interested trustees of BlackRock Multi-State Municipal Series Trust or by a vote of a majority of the outstanding voting securities of the Fund.

Example:

This Example is intended to help you compare the cost of investing in the Fund with the cost of investing in other mutual funds. The Example assumes that you invest \$10,000 in the Fund for the time periods indicated and then redeem all of your shares at the end of those periods. The Example also assumes that your investment has a 5%

return each year and that the Fund's operating expenses remain the same. Although your actual costs may be higher or lower, based on these assumptions your costs would be:

	1 Year	3 Years	5 Years	10 Years
Investor A1 Shares	\$70	\$255	\$456	\$1,034

Portfolio Turnover:

The Fund pays transaction costs, such as commissions, when it buys and sells securities (or "turns over" its portfolio). A higher portfolio turnover rate may indicate higher transaction costs and may result in higher taxes when shares are held in a taxable account. These costs, which are not reflected in annual fund operating expenses or in the Example, affect the Fund's performance. During the most recent fiscal year, the Fund's portfolio turnover rate was 35% of the average value of its portfolio.

Principal Investment Strategies of the Fund

The Fund invests primarily in a portfolio of long-term investment grade Pennsylvania municipal bonds. Pennsylvania municipal bonds are debt obligations issued by or on behalf of a governmental entity in Pennsylvania or other qualifying issuer that pay interest that, in the opinion of bond counsel, is excludable from gross income for Federal income tax purposes (except that interest may be includable in taxable income for purposes of the Federal alternative minimum tax) and exempt from Pennsylvania personal income taxes. These may be obligations of a variety of issuers including governmental entities in Pennsylvania and issuers located in Puerto Rico, the U.S. Virgin Islands and Guam. Under normal circumstances, the Fund will invest at least 80% of its assets in Pennsylvania municipal bonds. For the purposes of the foregoing 80% policy, "assets" are the Fund's net assets, plus the amount of any borrowings for investment purposes. The Fund's investments in derivatives will be counted toward the foregoing 80% policy to the extent that they provide investment exposure to the securities included within that policy or to one or more market risk factors associated with such securities. At least 80% of the Fund's assets will be invested in investment grade securities. Investment grade securities are securities which are rated in the four highest categories by at least one of the major rating agencies or determined by the management team to be of similar quality. When choosing investments, Fund management considers various factors, including the credit quality of issuers, yield analysis, maturity analysis and the call features of the obligations. Under normal circumstances, the Fund's weighted average maturity will be more than ten years.

The Fund may leverage its assets through the use of proceeds received through tender option bond transactions. In a tender option bond transaction, the Fund transfers municipal bonds or other municipal securities into a special purpose entity (a "TOB Trust"). A TOB Trust typically issues two classes of beneficial interests: short-term floating rate interests ("TOB Floaters"), which are sold to third party investors, and residual inverse floating rate interests ("TOB Residuals"), which are generally issued to the Fund. The Fund may invest in TOB Residuals and may also invest in TOB Floaters. The Fund will look through to the underlying municipal bond held by a TOB Trust for purposes of the Fund's 80% policy.

Principal Risks of Investing in the Fund

Risk is inherent in all investing. The value of your investment in the Fund, as well as the amount of return you receive on your investment, may fluctuate significantly from day to day and over time. You may lose part or all of your investment in the Fund or your investment may not perform as well as other similar investments. The following is a summary description of principal risks of investing in the Fund. The relative significance of each risk factor below may change over time and you should review each risk factor carefully.

■ Debt Securities Risk — Debt securities, such as bonds, involve risks, such as credit risk, interest rate risk, extension risk, and prepayment risk, each of which are described in further detail below:

Credit Risk — Credit risk refers to the possibility that the issuer of a debt security (i.e., the borrower) will not be able to make payments of interest and principal when due. Changes in an issuer's credit rating or the market's perception of an issuer's creditworthiness may also affect the value of the Fund's investment in that issuer. The degree of credit risk depends on both the financial condition of the issuer and the terms of the obligation.

Interest Rate Risk — The market value of bonds and other fixed-income securities changes in response to interest rate changes and other factors. Interest rate risk is the risk that prices of bonds and other fixed-income securities will increase as interest rates fall and decrease as interest rates rise.

The Fund may be subject to a greater risk of rising interest rates during a period of historically low interest rates. For example, if interest rates increase by 1%, assuming a current portfolio duration of ten years, and all other factors

being equal, the value of the Fund's investments would be expected to decrease by 10%. (Duration is a measure of the price sensitivity of a debt security or portfolio of debt securities to relative changes in interest rates.) The magnitude of these fluctuations in the market price of bonds and other fixed-income securities is generally greater for those securities with longer maturities. Fluctuations in the market price of the Fund's investments will not affect interest income derived from instruments already owned by the Fund, but will be reflected in the Fund's net asset value. The Fund may lose money if short-term or long-term interest rates rise sharply in a manner not anticipated by Fund management.

To the extent the Fund invests in debt securities that may be prepaid at the option of the obligor (such as mortgage-backed securities), the sensitivity of such securities to changes in interest rates may increase (to the detriment of the Fund) when interest rates rise. Moreover, because rates on certain floating rate debt securities typically reset only periodically, changes in prevailing interest rates (and particularly sudden and significant changes) can be expected to cause some fluctuations in the net asset value of the Fund to the extent that it invests in floating rate debt securities.

These basic principles of bond prices also apply to U.S. Government securities. A security backed by the "full faith and credit" of the U.S. Government is guaranteed only as to its stated interest rate and face value at maturity, not its current market price. Just like other fixed-income securities, government-guaranteed securities will fluctuate in value when interest rates change.

A general rise in interest rates has the potential to cause investors to move out of fixed-income securities on a large scale, which may increase redemptions from funds that hold large amounts of fixed-income securities. Heavy redemptions could cause the Fund to sell assets at inopportune times or at a loss or depressed value and could hurt the Fund's performance.

Extension Risk — When interest rates rise, certain obligations will be paid off by the obligor more slowly than anticipated, causing the value of these obligations to fall.

Prepayment Risk — When interest rates fall, certain obligations will be paid off by the obligor more quickly than originally anticipated, and the Fund may have to invest the proceeds in securities with lower yields.

■ **Municipal Securities Risks** — Municipal securities risks include the ability of the issuer to repay the obligation, the relative lack of information about certain issuers of municipal securities, and the possibility of future legislative changes which could affect the market for and value of municipal securities. Budgetary constraints of local, state, and federal governments upon which the issuers may be relying for funding may also impact municipal securities. These risks include:

General Obligation Bonds Risks — Timely payments depend on the issuer's credit quality, ability to raise tax revenues and ability to maintain an adequate tax base.

Revenue Bonds Risks — These payments depend on the money earned by the particular facility or class of facilities, or the amount of revenues derived from another source.

Private Activity Bonds Risks — Municipalities and other public authorities issue private activity bonds to finance development of industrial facilities for use by a private enterprise. The private enterprise pays the principal and interest on the bond, and the issuer does not pledge its full faith, credit and taxing power for repayment.

Moral Obligation Bonds Risks — Moral obligation bonds are generally issued by special purpose public authorities of a state or municipality. If the issuer is unable to meet its obligations, repayment of these bonds becomes a moral commitment, but not a legal obligation, of the state or municipality.

Municipal Notes Risks — Municipal notes are shorter term municipal debt obligations. If there is a shortfall in the anticipated proceeds, the notes may not be fully repaid and the Fund may lose money.

Municipal Lease Obligations Risks — In a municipal lease obligation, the issuer agrees to make payments when due on the lease obligation. Although the issuer does not pledge its unlimited taxing power for payment of the lease obligation, the lease obligation is secured by the leased property.

Tax-Exempt Status Risk — The Fund and its investment manager will rely on the opinion of issuers' bond counsel and, in the case of derivative securities, sponsors' counsel, on the tax-exempt status of interest on municipal bonds and payments under derivative securities. Neither the Fund nor its investment manager will independently review the bases for those tax opinions, which may ultimately be determined to be incorrect and subject the Fund and its shareholders to substantial tax liabilities.

■ **State Specific Risk** — The Fund will invest primarily in municipal securities issued by or on behalf of the Commonwealth of Pennsylvania. As a result, the Fund is more exposed to risks affecting issuers of Pennsylvania municipal securities than is a municipal securities fund that invests more widely.

■ **Market Risk and Selection Risk** — Market risk is the risk that one or more markets in which the Fund invests will go down in value, including the possibility that the markets will go down sharply and unpredictably. The value of a security or other asset may decline due to changes in general market conditions, economic trends or events that are not specifically related to the issuer of the security or other asset, or factors that affect a particular issuer or issuers, exchange, country, group of countries, region, market, industry, group of industries, sector or asset class. Local, regional or global events such as war, acts of terrorism, the spread of infectious illness or other public health issues like pandemics or epidemics, recessions, or other events could have a significant impact on the Fund and its investments. Selection risk is the risk that the securities selected by Fund management will underperform the markets, the relevant indices or the securities selected by other funds with similar investment objectives and investment strategies. This means you may lose money.

Recent policy initiatives undertaken by the U.S. government have the potential to impact international relations, trade agreements and the overall regulatory environment in ways that could create uncertainty and instability in domestic and global markets, and could adversely affect the investment performance of the Fund. In particular, actions taken by the U.S. government in respect of international trade relations could lead to trade wars, increased costs for imported goods, disruptions in supply chains, reduced foreign investment, and instability in regions where the Fund invests.

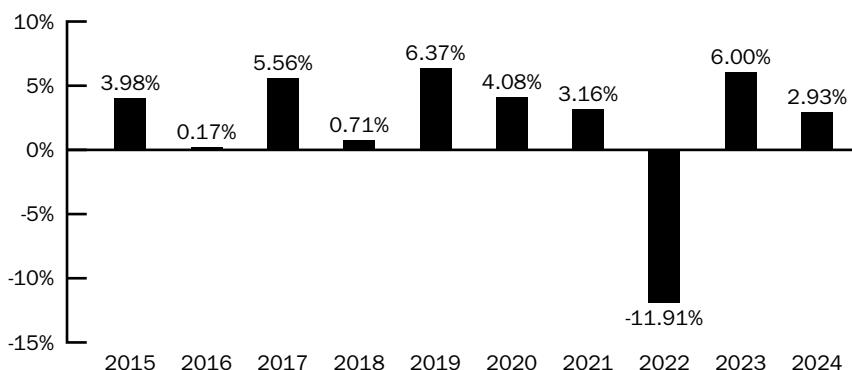
■ **Non-Diversification Risk** — The Fund is a non-diversified fund. Because the Fund may invest in securities of a smaller number of issuers, it may be more exposed to the risks associated with and developments affecting an individual issuer than a fund that invests more widely.

■ **Tender Option Bonds Risk** — The Fund's participation in tender option bond transactions may reduce the Fund's returns and/or increase volatility. Investments in tender option bond transactions expose the Fund to counterparty risk and leverage risk. An investment in a tender option bond transaction typically will involve greater risk than an investment in a municipal fixed rate security, including the risk of loss of principal. Distributions on TOB Residuals will bear an inverse relationship to short-term municipal security interest rates. Distributions on TOB Residuals paid to the Fund will be reduced or, in the extreme, eliminated as short-term municipal interest rates rise and will increase when short-term municipal interest rates fall. TOB Residuals generally will underperform the market for fixed rate municipal securities in a rising interest rate environment. The Fund may invest in TOB Trusts on either a non-recourse or recourse basis. If the Fund invests in a TOB Trust on a recourse basis, it could suffer losses in excess of the value of its TOB Residuals.

Performance Information

The information shows you how the Fund's performance has varied year by year and provides some indication of the risks of investing in the Fund. The table compares the Fund's performance to that of the Bloomberg Municipal Bond Index and a customized weighted index comprised of 90% Bloomberg Pennsylvania Total Return Index Unhedged USD and 10% Pennsylvania Bloomberg Municipal Bond: High Yield (non-Investment Grade) Total Return Index (the "Pennsylvania Customized Reference Benchmark"). The Pennsylvania Customized Reference Benchmark is relevant to the Fund because it has characteristics similar to the Fund's investment strategy. To the extent that dividends and distributions have been paid by the Fund, the performance information for the Fund in the chart and table assumes reinvestment of the dividends and distributions. As with all such investments, past performance (before and after taxes) is not an indication of future results. Sales charges are not reflected in the bar chart. If they were, returns would be less than those shown. However, the table includes all applicable fees and sales charges. If the Fund's investment manager and its affiliates had not waived or reimbursed certain Fund expenses during these periods, the Fund's returns would have been lower. Updated information on the Fund's performance, including its current net asset value, can be obtained by visiting www.blackrock.com or can be obtained by phone at (800) 882-0052.

Investor A1 Shares
ANNUAL TOTAL RETURNS
BlackRock Pennsylvania Municipal Bond Fund
As of 12/31



During the ten-year period shown in the bar chart, the highest return for a quarter was 8.64% (quarter ended December 31, 2023) and the lowest return for a quarter was -6.45% (quarter ended March 31, 2022). The year-to-date return as of June 30, 2025 was -1.65%.

For the periods ended 12/31/24

Average Annual Total Returns

	1 Year	5 Years	10 Years
BlackRock Pennsylvania Municipal Bond — Investor A1 Shares			
Return Before Taxes	2.93%	0.63%	1.97%
Return After Taxes on Distributions	2.93%	0.63%	1.97%
Return After Taxes on Distributions and Sale of Fund Shares	3.14%	1.17%	2.30%
Bloomberg Municipal Bond Index (Reflects no deduction for fees, expenses or taxes)	1.05%	0.99%	2.25%
Pennsylvania Customized Reference Benchmark (Reflects no deduction for fees, expenses or taxes)	2.26%	1.12%	—% ¹

1. The Pennsylvania Customized Reference Benchmark commenced in September 2016 and therefore the Pennsylvania Customized Reference Benchmark does not have a return for the 10-year period.

After-tax returns are calculated using the historical highest individual federal marginal income tax rates and do not reflect the impact of state and local taxes. Actual after-tax returns depend on the investor's tax situation and may differ from those shown, and the after-tax returns shown are not relevant to investors who hold their shares through tax-deferred arrangements, such as 401(k) plans or individual retirement accounts.

Investment Manager

The Fund's investment manager is BlackRock Advisors, LLC (previously defined as "BlackRock").

Portfolio Managers

Portfolio Manager	Portfolio Manager of the Fund Since	Title
Walter O'Connor, CFA ¹	2006	Managing Director of BlackRock, Inc.
Phillip Soccio, CFA	2009	Director of BlackRock, Inc.
Kristi Manidis	2022	Director of BlackRock, Inc.
Christian Romaglino, CFA	2022	Director of BlackRock, Inc.

1 On or about March 17, 2026, Walter O'Connor, CFA, will no longer serve as a portfolio manager of the Fund.

Purchase and Sale of Fund Shares

You may purchase or redeem shares of the Fund each day the New York Stock Exchange is open. To purchase or sell shares you should contact your Financial Intermediary or, if you hold your shares through the Fund, you should contact the Fund by phone at (800) 441-7762, by mail (c/o BlackRock Funds, P.O. Box 534429, Pittsburgh, Pennsylvania

15253-4429), or by the Internet at www.blackrock.com. The Fund's initial and subsequent investment minimums generally are as follows, although the Fund may reduce or waive the minimums in some cases:

Investor A1 Shares	
Minimum Initial Investment	Available only for purchase by certain employer-sponsored retirement plans and for dividend and capital gain reinvestment by existing shareholders.
Minimum Additional Investment	No subsequent minimum.

Tax Information

The Fund's dividends and distributions may be subject to U.S. federal income taxes and may be taxed as ordinary income or capital gains, unless you are a tax-exempt investor or are investing through a qualified tax-exempt plan described in section 401(a) of the Internal Revenue Code of 1986, as amended, in which case you may be subject to U.S. federal income tax when distributions are received from such tax-deferred arrangements.

The Fund intends to make distributions most of which will be excludable from gross income for federal income tax purposes and exempt from Pennsylvania personal income taxes.

Payments to Broker/Dealers and Other Financial Intermediaries

If you purchase shares of the Fund through a Financial Intermediary, the Fund and BlackRock Investments, LLC, the Fund's distributor, or its affiliates may pay the Financial Intermediary for the sale of Fund shares and related services.

These payments may create a conflict of interest by influencing the Financial Intermediary and your individual financial professional to recommend the Fund over another investment.

Ask your individual financial professional or visit your Financial Intermediary's website for more information.

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