FitchRatings

State Revolving Fund and Municipal Finance Pool Program Rating Criteria

Sector-Specific

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This report updates and replaces the "U.S. Public Finance State Revolving Fund and Municipal Finance Pool Program Rating Criteria," dated Aug. 11, 2021. The update follows Fitch's publication of "Exposure Draft: CLOs and Corporate CDOs Rating Criteria (CDO Criteria), which proposed a calibration update to its Portfolio Credit Model, including probability of default assumptions, confidence intervals, and correlation. These proposed changes have been finalized and incorporated in the "CLOs and Corporate CDOs Rating Criteria (CDO Criteria" report, published Sept. 17, 2021.

Given the relationship of these criteria to the CDO criteria, as described herein, Fitch has finalized modifications to its Portfolio Stress Model with this update, incorporating similar changes as those described in the CDO Criteria. No rating changes are expected as a result of this update. The reminder of these criteria remain unchanged.

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Scope

This report presents Fitch Ratings' criteria for assigning issuer- and obligation-specific ratings to state revolving fund (SRF) and municipal finance pool (MFP) programs. An MFP generically refers to a pool of debt obligations secured by municipal entities. SRFs are a type of MFP that fall under the purview of the U.S. Environmental Protection Agency through a federal-state partnership. SRFs represent the largest portion of Fitch's MFP-rated portfolio.

These criteria represent a sector-specific extension of Fitch's "Rating Criteria for Public-Sector, Revenue-Supported Debt." In limited cases, additional U.S. Public Finance (USPF) sectors including Water and Sewer, Public Power, and Prepaid Energy also utilize Fitch's Portfolio Stress Model (PSM), as described herein, to calculate losses for multiple-entity structures or pools. The criteria apply to both the assignment of new ratings and the surveillance of existing ratings.

Key Rating Drivers

Portfolio Credit Risk: Fitch's analysis begins with an assessment of the aggregate credit quality of the underlying program obligors using Fitch's PSM. The PSM produces liability rating stress hurdles based on the aggregate rating, principal exposure (or weight) and term of underlying pool obligors. The rating stress hurdle is measured against the output of Fitch's Excel-based State Revolving Fund Cash Flow Model (CFM) to produce a model-derived rating outcome. This measurement forms the primary basis of Fitch's quantitative analysis, while the remaining key rating drivers and other qualitative factors could result in adjustments to Fitch's final rating.

Strength of Financial Structure: Fitch uses its CFM tailored to reflect a program's structural mechanics. The model measures whether sufficient program resources are available to meet timely bond debt service payments while sustaining obligor payment defaults.

Legal Risk: Fitch's analysis of the legal risk includes a review of the master financing agreements, which typically govern all bonds issued under each program, and all other relevant program documents. The legal review primarily focuses on the flow of funds and the security provided to the bonds based on the pledge of program resources.

Adequacy of Program Management: Fitch evaluates the sufficiency of management's policies and procedures including underwriting criteria, performance monitoring procedures, program goals and other program requirements. These factors typically support strong historical performance as measured by few obligor delinquencies and near-zero permanent defaults.

Background

SRF and MFP programs enable government entities to fund municipal needs such as water and sewer infrastructure, schools, roads and public buildings. Akin to structured finance vehicles, these programs combine a pool of obligor payments with additional forms of credit enhancement (such as reserve funds), thereby reducing the risk of a single-obligor nonpayment that could ultimately cause a bond default. Due to this, programs can often achieve higher ratings than would otherwise be possible on an individual obligor basis.

As described below, in the context of Fitch's model analyses, a "default" is either a temporary shortfall in an underlying obligor's payment obligation (principal and interest) or a permanent writedown of an obligor's principal obligation. A "recovery" is assumed to be either a scenario in which an obligor suffers a temporary shortfall but is able to financially support a certain percentage of its original debt obligation or, for the writedown scenario, the percentage that an obligor is required to pay post-bankruptcy ruling.

Applicable Criteria

Public Sector, Revenue-Supported Entities Rating Criteria (September 2021)

CLOs and Corporate CDOs Rating Criteria (September 2021)

U.S. Public Finance Tax-Supported Rating Criteria (May 2021)

U.S. Water and Sewer Rating Criteria (March 2021)

Structured Finance and Covered Bonds Counterparty Rating Criteria (January 2020)

Overview of Models and Tools Applied Under These Criteria

Portfolio Stress Model (PSM)	Assesses the aggregate default risk of a program's portfolio of pledged obligors. Produces rating thresholds or hurdles for each ascending rating category (e.g., 'AAA', 'AA', 'A', etc.). This is considered a primary model under these criteria as it applies to virtually every SRF/MFP sector rating.
State Revolving Fund Cash Flow Model (CFM)	Assesses the sufficiency of a program's available credit enhancement, which is typically in the form of pledged reserve funds or annual debt-service cash flow surpluses, to cover hypothetical losses. Produces a breakeven default tolerance rate that is measured against the PSM's hurdles to suggested a model-implied rating outcome. This is also considered a primary model under these criteria as it applies to virtually every SRF/MFP sector rating.
Purchaser Credit Index (PCI)	Tool used to assign credit scores to utility-sector obligors that do not carry a public rating or an internal credit opinion. This is considered a primary tool under these criteria as it applies to approximately half of SRF/MFP sector ratings.
Portfolio Asset Model (PAM)	Used to assess the market-value risk of nonstandard collateral investments. This is considered a secondary model under these criteria as it applies to only a few SRF/MFP sector ratings.

Source: Fitch Ratings.

Portfolio Analysis

This analysis of a program's portfolio is key as payments from underlying obligors ultimately form the main source of security for bondholders. The credit quality of the pool is determined using Fitch's PSM, the results of which are the liability rating stress hurdles.

Fitch's Portfolio Stress Model

Given the similarities of each sector, the PSM follows the same methodology and benchmarking as described in the "CLOs and Corporate CDOs Rating Criteria" (CDO Criteria). Like the CDO Criteria's Portfolio Credit Model (the CDO model), the PSM is used to measure the joint default behavior within credit portfolios. Like the CDO model, the PSM is also based on the Gaussian copula function.

Average historical *corporate* default rates serve as inputs to both models and are used to derive the base weighted average default rate (WADR) of a portfolio. Each obligor's related debt rating is mapped to a corresponding corporate-bond's historical probability of default (i.e., an 'A' rated pool participant with a 10-year bond maturity is mapped to an 'A' corporate-bond's historical probability of default with the same period of exposure).

Once the pool-level WADR is determined, an approximation of the Gaussian copula function is incorporated to produce liability rating stress hurdles at each rating category. The remaining inputs to the Gaussian function used to produce the stress hurdles are a target statistical threshold at each rating (or confidence level, which is equal to one minus the targeted rating-level's default probability) and a correlation parameter. For more information on the correlation framework utilized, see Addendum A.

Because of a lack of comparable or statistically significant default data among public-sector entities, corporate default rates are utilized by Fitch to form the basis of its PSM assumptions. The use of corporate default rates factors in a desired degree of conservatism vis-à-vis public sector defaults, which Fitch deems appropriate given the lack of a meaningful stress period experienced in the public sector.

Example PSM Target Confidence Levels (%)[a]

'AAA'	99.92
'AA'	99.76
'A'	99.05
'BBB'	96.84

[a]Assumes 10-Year exposure period.
Source: Fitch Ratings

Fitch Portfolio Stress Model — Key Inputs

Obligor Rating	Fitch's rating of a parity debt instrument of each pool obligor. In absence of a parity rating, a parity rating from another Nationally Recognized Strategic Rating Organization will be used.
Outstanding Par	Total outstanding pledged debt balance for each obligor. Multiple debt issuances or separate liens are combined in the PSM.
Debt Maturity	The weighted-average maturity of each obligor's pledged debt instruments. In absence of maturity schedules, the maturity of the longest-dated debt instrument will be used.

Source: Fitch Ratings.

PSM: Additional Portfolio-Level Assumptions

In the PSM, multiple obligations of the same security type issued by a single entity are combined to take into account the full concentration risk a large single obligor could present in a pool. Similarly, senior, junior and/or subordinate obligations are also combined, with the rating of the most junior obligation utilized.

Fitch maintains public parity ratings on many of the obligors in the pools it rates. Where a particular obligor is not rated by Fitch, if available, the lower of the rating assigned by either S&P or Moody's will be applied in Fitch's PSM. If an obligor has only a public senior lien rating and the obligor's security pledge is junior or subordinate, Fitch will assume that the obligor rating is one to two notches lower than the public senior lien rating (i.e. one notch for second lien and two notches for third lien). Fitch neither uses public ratings assigned to a different security type nor ratings based on insurance providers.

Obligor Concentration

Fitch recognizes that, in some cases, small pools or pools with high single-obligor concentration may suffer from greater volatility than a large, diverse pool. To account for this risk, Fitch applies a 50% uplift to the default rate of the top five risk contributors (measured by obligor weight multiplied by its corresponding default rate). For example, assuming a 10-year term, a 'BBB' rated obligor would be assumed to have a risk-weighted default rate of 4.8% (WADR of 3.2% x 150%). Fitch may also apply lower recovery rates, typically in the 50%–75% range, to the largest one or two obligors (depending on the relative size of each) to test the effect such recoveries could have on program bond repayment.

Fitch may choose to not rate programs with less than 10 obligors under these criteria, as it does not believe programs with so few obligors would constitute a pool. In addition, programs with excessively large single-obligor concentration also may not be rated by Fitch under these criteria. If Fitch chooses to rate these programs (typically when a currently rated program is in runoff mode), they would likely be subject to additional analytical scrutiny including lower recoveries as described previously.

Depending on certain factors such as the sensitivity a rating may show under Fitch's concentration stress scenarios, programs may be capped at a certain level linked to the rating of the largest obligor(s).

Assessment of Unrated Obligors and Obligors on Rating Watch

In its effort to confirm consistency with the assumptions laid out in these criteria, for pools with minimal publicly rated entities, Fitch may assign either credit opinions or credit scores (together, "credit assessments") in order to achieve a credit view on approximately one-third (33%) of the pledged pool. Additionally, to capture the risk of larger unrated obligors in the PSM, Fitch will assign credit assessments to those representing more than 5% of the pool's total par.

Material obligors, or those representing in excess of 25% of pool par, that do not carry public ratings are typically expected to be assigned an internal credit opinion. Credit scores, which apply only to non-material USPF utility-sector obligors, are assigned in accordance with the Purchaser Credit Index (PCI) Scoring Matrix, as described in Fitch's "U.S. Water and Sewer Rating Criteria." The resulting PCI scores of 1, 2, 3 and 4 are mapped sequentially to 'aa', 'a', 'bbb', or 'bb' before being included in the PSM. Fitch's internal credit assessments are generally based on publicly available information, such as financial audits.

Example PSM Stress Hurdles

'AAA'	16.7
'AA'	14.1
'A'	11.1
'BBB'	8.5

Source: Fitch Ratings.

The remaining unrated portion of the portfolio is generally assumed to carry a floor credit quality of 'BB'. The floor credit quality is based on the expectation that the average resulting credit opinion assigned by Fitch to SRF and MFP obligors would be a minimum of 'BB', even though some credits, if reviewed, may garner lower credit opinions. Pools of obligors perceived to have a lower average credit quality than 'BB' may be assigned a lower floor rating by Fitch.

If public information is limited or unavailable, or if the security pledge is esoteric, Fitch may choose not to assign a credit opinion or score. For this to be the case, surplus program cash flows and/or reserves would need to be sufficiently strong to demonstrate that it would be highly improbable that the total loss of the entity would interrupt program bond payment. These cases are expected to be limited to obligors representing less than 10% of the pool total.

Rated obligors on Rating Watch Negative (RWN) are considered to be rated one notch below their published rating. If public information is available describing potential further downgrades, such information will be taken into account by Fitch in its analysis.

Obligors Enhanced by State Protections

In its assessment of program obligors, Fitch will consider protection from state intercept mechanisms if historical state aid receipts are well in excess of maximum annual debt service (MADS) payments for a particular obligor or obligors. The mechanisms must ensure that either state aid payments flow to pay the pool's debt service in a timely manner or program-level reserves are sufficient to allow continued bond performance until the aid is captured. The credit assessment assigned in these cases will generally be one notch lower than the general obligation rating of the state. Additionally, Fitch may apply a rating uplift to individual obligors that benefit from the moral obligation of its respective state to replenish debt service reserve funds. For more information on these topics, see Fitch's "U.S. Public Finance Tax-Supported Rating Criteria."

Structural Analysis and Cash Flow Modeling

Fitch's structural analysis of SRF and MFP programs involves a review of program assets (typically pledged obligor payments and/or reserves), program liabilities (i.e. bond debt service) and any structural features, such as de-allocation provisions and reserve requirements, cross-collateralization features and additional bonds tests (ABTs). In its analysis, certain sources of program resources may be given less weight based on Fitch's review of a program's legal documentation. For more information on the level of legal security provided by each asset, see the Legal Analysis section on page 8.

From a quantitative or modeling standpoint, to qualify for a particular rating level, a pool typically must demonstrate that combined cash flows are sufficient to cover expected losses under a respective rating stress scenario. To test this, Fitch uses an internal CFM customized to reflect the financial structure of each program. The CFM incorporates the liability rating stress hurdles produced by the PSM to demonstrate the relative financial strength of the program.

SRF and MFP Programs — Sources of Cash

Obligor Payments	Obligor payments represent the primary form of structural security available to bondholders.
Program Equity/ Credit Enhancement	Program equity or credit enhancement (CE) provides the protection through which the pool can sustain some level of obligor defaults and continue to make timely payments to bondholders. CE is structured in one of three ways: pledged reserves, typically derived from a debt service reserve fund; surplus obligor cash flows; or a combination of pledged reserves and excess cash flows (hybrid).
Nonpledged Equity	Examples of nonpledged equity include surplus obligor payments, reserves or other pledged assets de-allocated or released from the program indenture back to a general or recycling fund and, therefore, are no longer legally pledged to the program. Credit given to nonpledged revenues will be determined on a case-by-case basis.

Source: Fitch Ratings.

Fitch's Cash Flow Model

The CFM applies losses to the program's schedule of pledged obligor payments through maturity to find the four-year default tolerance rate, or the break-even amount of defaults a program can withstand over a four-year period until program resources (including pledged obligor payments, any reserves and account earnings) are no longer sufficient to pay bond debt service in full.

The four-year stress period is meant to represent a severe, protracted recessionary economic environment and is tested to begin at three distinct points. Generally, Fitch applies the default tolerance test in the first, middle and last four years of a program's life, but may stress other four-year periods if structural weaknesses such as low coverage ratios are present within the cash flows.

The default tolerance rate is typically spread evenly in the CFM over each respective four-year stress period (i.e. 25% per year). If debt service payments occur more often than annually and are uneven (e.g. semiannual payments of 80% of yearly total on the first payment date and 20% on the second payment date), Fitch may apply such interim defaults on a weighted average (WA) basis. To account for amortization of the underlying obligors in the middle and back scenarios, the default tolerance rate is applied only to the remaining schedule of pledged obligor payments.

Along with the default tolerance stress, an immediate recovery of the defaulted asset is typically assumed in the CFM. Due to the strong rate-setting power of public utilities or taxing power of local governments (for tax-backed credits), Fitch assumes a robust recovery of 90% (or, in the case of a debt service payment shortfall, a 10% shortfall) for these security types.

Fitch SRF Cash Flow Model — Key Inputs

Cash Sources	Total obligor payment schedule (outstanding and new issuance). Total other sources of cash, such as subsidies and GIC revenue. Current reserve and surplus fund balances.
Cash Uses	Total bond debt service schedule (outstanding and new issues).
Debt Service Reserve Requirement(s)	Applicable debt service coverage requirements, such as MADS test (measures remaining equity at the beginning of each stress period following reserve de-allocation).
Surplus Release Parameters	Surplus fund release or de-allocation requirements, such as release delay timing and/or coverage ratio requirements.
PSM Results	Liability rating stress hurdle results produced by Fitch's PSM.

Source: Fitch Ratings.

Fitch's assumption of a 90% asset recovery is based on its view that debt secured by utility revenues or general obligation pledges will still perform at some level while in default and that, post-default, the issuer, pursuant to the underwriting agreement, will work with the obligor to set rates at a level that ensures full payment of debt service due, including debt in arrears. A detailed example of how Fitch calculates a program's default tolerance rate in its CFM is provided in Addendum B.

Programs with bonds secured by nontraditional pledges such as transportation or healthcare revenue will be assessed at a lower recovery level by Fitch. Fitch's base recovery assumption for non-traditional pledges will typically range between 60% and 70%, but may be scaled up or down depending on the seniority of such pledge, the historical performance of the program and/or the strength of program management. Recovery scaling will range from negative 10% (haircut) to +10% (uplift), as shown in the table below.

Recovery Rate Scaling Factors[a]

Pledge Seniority	• First Lien: 0%. • Second Lien: (5%). • Third Lien: (10%).
Historical Performance/Strength of Management	• Stronger: 10%. • Midrange: 5%. • Weaker: 0%.

[a]Applies to nontraditional pledge types only; subject to credit committee approval.
Source: Fitch Ratings.

The CFM compares the resulting default tolerance rate generated in the model under each scenario (first, middle and last) to the liability rating stress hurdle produced by the PSM to suggest a pass/fail result. If the PSM rating hurdle is less than the pool's default tolerance rate, the cash flow model would indicate a pass result *(see Cash Flow Model Scenario Example at right)*. Conversely, if the PSM's rating hurdle is greater than the pool's default tolerance rate, the CFM would indicate a fail result.

Relationship of Model Results to Final Rating

To be eligible for a certain rating, a program typically must demonstrate that enough program enhancement exists to cover defaults in excess of the PSM's relevant rating stress hurdle. However, in some instances, a program may achieve a rating above what is indicated by model output alone. An example of this would be a program that passes the first and middle four-year stress, but fails the past four-year stress by a minimal margin. In such a case, if the program is not closed, Fitch would expect the issuer to outline its plans to strengthen the program in subsequent issues.

Furthermore, passing a rating hurdle does not guarantee that the program will achieve the corresponding rating. Weakness in management (including underwriting and monitoring policies), non-standard/esoteric security pledges or excessively large single obligors without other mitigating factors (e.g. structural enhancement such as exceptional reserve balances and/or annual debt service coverage in significant excess of comparable median) may cause a pool's debt to be placed in a lower category than indicated by the stress test alone. If an assigned rating does not match the model output, it typically would be within three notches of such output.

Modifiers (i.e. "+" or "–") may be used to reflect Fitch's qualitative assessment of the pool characteristics cited in the prior paragraph. Modifiers can also reflect the margin by which a program passes a given category's stress test. For example, pool X (with adequate general credit characteristics) may barely pass the 'A' category rating hurdle and thus be assigned Fitch's 'A–' rating, while pool Y, with strong general credit characteristics, may pass the hurdle by a wide margin, earning it an 'A+' rating. Similarly, two pools passing a category rating hurdle by similar margins may earn different ratings within the rating category based on one pool's stronger management practices, investment policies or legal protections for bondholders.

Fitch may choose to not use model analyses if pledged reserves are greater than outstanding bonds or if minimum annual debt service coverage is 3.0x or greater, as is it would be highly improbable that any scenario would produce a model failure.

Cash Flow Model Scenario Example

Default Tolerance Rate – First Four Years (%)	87.5
Less PSM 'AAA' Hurdle (%):	16.7
Net Cushion (%)	**70.8**
Scenario Result	Pass

Source: Fitch Ratings.

Debt Service Reserve Fund Requirements

Programs that derive credit enhancement through excess cash flows may contain provisions requiring debt service reserve funds to be maintained at certain levels. For example, some programs require debt service reserve funds to be maintained at the lesser of 1.25x average annual debt service, 1.0x MADS or 10% of outstanding bond amount (note that the coverage requirements may vary by program). Any excess amounts are then released to the surplus fund, or revenue fund. Fitch incorporates applicable reserve fund requirements into its CFM to account for expected asset/liability coverage at each scheduled bond payment date.

For new ratings, Fitch requests cash flows incorporating all of Fitch's aforementioned assumptions from the issuer or the issuer's representative. Issuer cash flow results will be compared to Fitch's own results to ensure consistency.

Surplus Reserve Fund Release Requirements

Pooled programs often contain time and/or threshold requirements that, if met, allow surplus funds to be released or de-allocated from the program to be used for general purposes, at which time they may no longer be pledged as security to bondholders. Fitch incorporates these tests into its CFM to measure the expected amount of enhancement available to the program at the beginning of each stress period after taking into account de-allocation of surplus amounts.

Investment Credit Quality and Market-Value Risk

Reserves are typically held in qualified investments subject to certain credit quality and liquidity requirements (For more information on Fitch's view of qualified investments, see "Structured Finance and Covered Bonds Counterparty Rating Criteria"). Investments that do not fall within the scope of these criteria will either not be given credit in Fitch's analysis or will be subject to additional stresses as described below.

Stresses applied to nonstandard investments typically will include forming a base case loss assumption by each asset category utilizing the portfolio analysis model (PAM) associated with the "U.S. Not-For-Profit Hospitals and Health Systems Rating Criteria." In determining the base case loss, the PAM has been calibrated to encompass the peak three-year decline in asset values since 2001, which includes the 2008 financial crisis. Fitch's 'AAA' and 'AA' level ratings case assumes that aggregate investment losses are 2.0x and 1.6x the base case loss, respectively. Using a multiple of the base case loss follows the same approach used to calibrate Fitch's PSM and is based on analyses performed under Fitch's CDO criteria.

Certain funds may be subject to lock-up periods, effectively limiting the ability to tap the underlying investments in a timely manner, should they be required. Such funds may be discounted up to their full value, depending on the nature or length of the lock-up period, prior to applying the PAM stress. Lastly, highly illiquid assets such as real-estate and private-equity investments will be subject to an additional liquidity haircut expected to range from 5%–10%, depending on the investment type.

Variable-Rate/Short-Term Debt

Fitch considers the degree to which SRF and MFP programs match their assets and liabilities and the degree to which they are vulnerable to market risk. SRFs and MFPs that issue short-term or variable-rate debt may mitigate market risk if the proceeds are invested in similar debt structures (i.e. for providing bridge loans and adjustable-rate loans of the same duration). Conversely, in a rising interest rate environment, securing short-term notes or variable-rate bonds with long-term, fixed-rate loans may cause the program's funding rate to become higher than its lending rate. Alternatively, a program that issues fixed-rate, long-term bonds and makes short-term or variable-rate loans may face similar problems if interest rates decline and it cannot issue new loans at interest rates high enough to cover the debt service on its bonds.

SRF and MFP programs may utilize swaps or other hedging techniques to synthetically match their assets and liabilities. In such cases, Fitch will examine the swap terms and counterparties, particularly with regard to basis risk and termination events, to assess the risks involved. To the extent there is an unhedged mismatch between variable-rate debt and fixed-rate loans, or fixed-rate debt and variable-rate loans, Fitch will assume a worst-case interest rate scenario, as specified in the bond documents, and incorporate any resulting market-based losses into its modeling. For more information on Fitch's view on counterparties, see "Structured Finance and Covered Bonds Counterparty Rating Criteria."

Legal Analysis

Fitch's analysis includes a qualitative review of the program's legal documentation. Fitch's goal is to assess the level of security provided by each program resource based on the legal protections available to bondholders.

Pledged Cash Flows

Obligor payments provide the primary security for SRF and MFP program bondholders. Forms of secondary security include reserve funds, annual obligor payments made in excess of program bond debt service or a combination of pledged reserves and excess cash flows (hybrid). These forms of secondary protection provide program credit enhancement that helps protect bondholders from losses.

Program Enhancement Provisions

For structures enhanced by overcollateralization, or surplus obligor payments made in excess of program bond debt service, Fitch reviews the ratio by which annual pledged resources cover program bond debt service. Fitch views minimum cash flow coverage requirements, as established under the indenture of at least 1.25x, to be strong for pooled programs. Coverage requirements of 1.10x or less are viewed as weaker. Nevertheless, Fitch acknowledges that most highly rated pooled programs using overcollateralization as the primary form of credit enhancement have maintained coverage levels well in excess of legal requirements.

For reserve fund-enhanced structures, Fitch's analysis considers the presence of program reserve requirements expressed as a percentage of the outstanding bonds, obligor debt service or a stated dollar amount. As program bonds amortize, a proportionate amount of the common reserves typically is released or de-allocated and used to support program debt service on a subordinate basis. Either immediately or after a minimum holding requirement, surplus reserve releases are then deposited into the issuer's nonpledged equity fund. Fitch also analyzes reserve fund release provisions, which often require that a cash flow coverage test be met before funds are released.

For programs with a combination surplus and reserve (or hybrid) enhancement, Fitch analyzes the sufficiency of cash flow coverage, pledged-program reserve balances and any program requirements for each of these factors. The overall adequacy of reserve and cash flow coverage requirements for each pooled program will vary due to different portfolio profiles, default tolerance levels, program enhancement needs and program rating targets.

Most clean water and drinking water SRF programs derive significant enhancement from federal capitalization grants and required state matching grants (currently 20%), which are usually invested in reserve funds or used to provide overcollateralization. Some SRFs obtain the required match through state appropriations or state bond proceeds. Many programs supplement state contributions by issuing state match bonds, while others meet the requirement from a fixed share of a state revenue stream. Other MFPs derive program enhancement from state appropriations.

Other Legal Protections

Many programs maintain an ABT. Fitch's review of the ABT is similar to that of the cash flow coverage requirement.

As allowed under federal law, clean water and drinking water SRFs are separately accounted for, but can be cross-collateralized, meaning that deficiencies in one SRF's account may be covered by available moneys from the other SRF. This feature enhances bondholder security by providing additional sources of available revenues from which to draw for debt service and also increases the overall diversity of the program's portfolio, allowing Fitch to analyze the program as one pool instead of two separate SRF portfolios. Any such transfer creates a repayment obligation by the deficient SRF, but the obligation typically is subordinate to the trust estate's pledge under the bond indenture.

Underwriting Documents

Another key credit characteristic of SRFs and MFPs is the security backing obligor payments. This can be in the form of a general obligation pledge, water and sewer enterprise fund revenues, other enterprise fund revenues or some other form of tax levy.

In addition to the primary security pledge, programs may have other protections to provide recourse should an obligor default on a payment obligation. Some pooled programs may be backed by a state aid intercept that, upon a missed payment, allows the program manager to garner state aid payments that would otherwise be paid to the obligor. In certain instances, underwriting agreements can also require the obligor to establish an additional local reserve fund, remit payments incrementally in advance of the bond payment date, or pay a higher interest rate on a delinquent payment. Moreover, many structures allow the issuer to take legal action against an obligor in default and may ultimately allow for the liquidation of the asset financed or other assets that secure the obligation.

Program Management

Fitch's assessment of program management is qualitative in nature and includes an evaluation of management's processes and procedures such as underwriting criteria, obligor performance monitoring procedures, technology, program goals and requirements, historical delinquencies and defaults and workout.

Underwriting Policies

Fitch reviews obligor underwriting criteria for consistency with its revenue and tax-backed rating guidelines, which generally consist of a review of an entity's financial, managerial and technical capabilities. Fitch also reviews a sampling of any new unrated obligors at the time of each new money sale to assess consistency between underwriting policies and legal documentation.

For existing programs, Fitch considers management's underwriting track record and related performance history of each obligor. Given management's underwriting requirements, obligations currently in arrears or those that have had recent performance issues are generally not eligible to participate in revolving fund lending. If delinquent obligors or obligors facing financial difficulties are added to the pool, Fitch may apply additional stresses in its model analysis, such as an increase to the base default rates. For new programs, Fitch considers the underwriting in its assessment of management and underwriting adequacy.

Monitoring

Fitch's analysis considers management's processes and staffing levels for monitoring existing obligors. Fitch also notes the timing of obligor payment schedules, as obligor payment schedules that precede bond payment dates can provide an early warning of an obligor's financial weakness. Fitch also considers management's response plans and legal controls to avoid unplanned draws on reserves or excess cash flows. Courses of action may include enforcing covenants or general obligation tax levies to cure deficiencies, triggering state aid intercept mechanisms, replacing troubled obligors with performing ones or appointing a receiver. Fitch will evaluate management's response to any delinquent obligor payments as a possible indication of future performance. A solid history of avoiding delinquent repayments and unplanned reserve draws is viewed as a credit strength.

Counterparty Exposure

As a general principle, where the financial resources or cash flows of a program are dependent on the financial performance of a third party, Fitch would examine how this counterparty risk is mitigated, such as through the use of rating triggers or financial ratio tests. Details of its counterparty criteria are explained in Fitch's "Structured Finance and Covered Bonds Counterparty Rating Criteria."

Program Surveillance

The timely surveillance review of existing ratings is an essential part of Fitch's rating process. The surveillance or subsequent rating committee follows the same quantitative methodology implemented during the initial rating process. As part of the review, an analyst compares program performance to date versus expectations described in previous rating reviews. Additionally, other performance-related measures will also be examined, such as portfolio delinquencies, defaults and subsequent workouts, the amount of enhancement available and the evaluation of microeconomic and macroeconomic issues affecting the program. Information utilized by Fitch for its surveillance reviews is provided in Addendum C.

Data Sources

In determining the PSM's liability rating stress hurdles, Fitch utilizes long-term default rates of nonfinancial corporates and financial institutions, the same dataset used in the CDO criteria. This represents over three decades of data and incorporates default rates from all three major rating agencies. Fitch believes this data set to be robust and objective, as it reflects the broadest set of default statistics available, and minimizes the risk of any variances in ratings approach or industry coverage. The period examined was marked by the emergence of modern debt markets, including the growth of a true high-yield debt class. The period also includes a number of moderate and severe economic downturns, with accompanying surges in corporate bankruptcies and defaults across a range of industries.

Fitch's criteria assumptions, analysis and rating decisions are based on relevant information available. The sources are the issuer, the arranger, financial-advisory consultants, third-party engineers or consultants and the public domain. This includes publicly available information on the issuer such as data available on the issuer's website and regulatory filings.

Variations from Criteria

Fitch's criteria are designed to be used in conjunction with experienced analytical judgment exercised through a committee process. The combination of transparent criteria, analytical judgment applied on a transaction-by-transaction or issuer-by-issuer basis, and full disclosure via rating commentary strengthens Fitch's rating process while assisting market participants in understanding the analysis behind our ratings.

A rating committee may adjust the application of these criteria to reflect the risks of a specific transaction or entity. Such adjustments are called variations. All variations will be disclosed in the respective rating action commentaries, including their impact on the rating where appropriate.

A variation can be approved by a ratings committee where the risk, feature or other factors relevant to the assignment of a rating and the methodology applied to it are included within the scope of the criteria but the analysis described in the criteria requires modification to address factors specific to the particular transaction or entity.

Criteria Disclosures

Fitch expects to disclose the following items in its rating action commentary:

- Key rating drivers.
- PSM and CFM results including any material non-standard model assumptions.
- Any discounts applied to investments.
- Rating sensitivities.
- Other third-party data used in Fitch's analysis not otherwise described herein.
- Any variations to criteria will be detailed in Fitch's rating action commentary *(as previously mentioned in the Variations from Criteria section above).*

In many cases, Fitch uses the assumptions derived from its initial rating analysis in its surveillance reviews. In order to focus Fitch's rating action commentaries on the most important changes to the rating, Fitch will not disclose these assumptions in subsequent rating action commentaries, unless there is a material change to the assumption.

Limitations

Ratings, including Rating Watches and Outlooks, assigned by Fitch are subject to the limitations specified in Fitch's Ratings Definitions, available at www.fitchratings.com/site/definitions.

Rating Assumption Sensitivity

Ratings are sensitive to the following:

- Changes in pool credit quality, thus resulting in a change in Fitch's liability rating stress hurdle. Changes that could affect pool credit quality include shifts in concentration, obligor credit quality, the WA life of the pool and obligor security pledges.
- Changes in the program's financial structure including increases or decreases in program leverage (i.e. assets to liability ratios), changes in reserve investments affecting credit quality and/or liquidity, and other related changes in program credit enhancement.
- Realization of any actual defaults and subsequent recoveries lower than Fitch's current assumptions.

The rating implied by Fitch's modeling analyses may be adjusted up or down based on the above factors and others, such as linkage to a significantly large single obligor.

Addendum A: PSM Correlation Framework

In the PSM, correlation controls for the potential risk of future default volatility in excess of historical averages. At a correlation of 0%, the resulting rating stress hurdle would be equal to the input WADR, thus providing no extra loss protection to bond holders beyond historical default levels.

The PSM's correlation framework follows that of its related CDO Model, which was calibrated to fit within Fitch's views of credit risk: that investment-grade ratings should perform robustly even in periods of peak rates of default, and that bond ratings of 'A' and higher should not default in periods matching historical stresses. *(See the below table for examples of coverage of peak defaults).*

In testing various portfolio composition cohorts, a pairwise correlation of 8.0% produced the desired results for a large, highly diverse, or minimally correlated portfolio. Given that Fitch views municipal defaults as not having historically demonstrated any correlated behavior, the PSM is based on this specific correlation parameter. However, to account for the smaller number of default observations at 'AA' and 'AAA', the targeted thresholds have been adjusted to increase the level of confidence required for these rating levels.

For more information on the calibration applied, examples of the empirical data used in the PSM, and further detail of the model benchmarking utilized, see the CDO Criteria.

The PSM diverges from the CDO Model in that it adopts a simplified, single-factor formulaic approach, whereas the CDO model uses a more complex, multifactor approach via a Monte-Carlo Simulation. Therefore, to account for these differences while producing the same or similar results, the PSM uses a correlation curve as a proxy to replicate the CDO model's pairwise correlation of 8.0%.

Example PSM Results and Coverage of Peak Defaults[a]

	Pool WADR: BB	Pool WADR: BBB
Peak Observed Historical Default Rate (%)	**28.8**	**9.3**
PSM Rating Stress Hurdles (%)		
AAA	39.8	16.7
AA	35.6	14.1
A	30.4	11.1
BBB	25.3	8.5
Coverage of Peak Defaults (x)		
AAA	1.4	1.8
AA	1.2	1.5
A	1.1	1.2
BBB	0.9	0.9

Source: Fitch Ratings.

Addendum B: Fitch SRF and MFP Cash Flow Model Example

Cash Flow Model Summary Output

Break-Even Default Tolerance Rate (%):	87.5
Debt Service Reserve Fund Balance ($):	2,500,000

Year[a]	Schedule of Obligor Payments ($)	Remaining Agg. Obligor Payments ($)	Annual Default Timing Allocation[b] (%)	Total Defaulted Obligor Payments ($)[c]	Total Losses (Post 90% Recovery) ($)[d]	Obligor Payments Collections — Post Stress ($)[e]	Scheduled Program Debt Service Payments ($)	Debt Service Shortfall ($)[f]	Beginning Reserve Fund Balance ($)	Use of Reserve Fund ($)[g]	Ending Reserve Fund Balance ($)[h]	Coverage Ratio (Including Reserve Transfers) (x)[i]
1	2,000,000	40,000,000	25	8,750,000	875,000	1,125,000	1,750,000	(625,000)	2,500,000	(625,000)	1,875,000	1.00
2	2,000,000	—	25	8,750,000	875,000	1,125,000	1,750,000	(625,000)	1,875,000	(625,000)	1,250,000	1.00
3	2,000,000	—	25	8,750,000	875,000	1,125,000	1,750,000	(625,000)	1,250,000	(625,000)	625,000	1.00
4	2,000,000	—	25	8,750,000	875,000	1,125,000	1,750,000	(625,000)	625,000	(625,000)	0	1.00
5	2,000,000	—	—	—	—	2,000,000	1,750,000	—	—	—	—	1.14
6	2,000,000	—	—	—	—	2,000,000	1,750,000	—	—	—	—	1.14
7	2,000,000	—	—	—	—	2,000,000	1,750,000	—	—	—	—	1.14
8	2,000,000	—	—	—	—	2,000,000	1,750,000	—	—	—	—	1.14
9	2,000,000	—	—	—	—	2,000,000	1,750,000	—	—	—	—	1.14
10	2,000,000	—	—	—	—	2,000,000	1,750,000	—	—	—	—	1.14
11	2,000,000	—	—	—	—	2,000,000	1,750,000	—	—	—	—	1.14
12	2,000,000	—	—	—	—	2,000,000	1,750,000	—	—	—	—	1.14
13	2,000,000	—	—	—	—	2,000,000	1,750,000	—	—	—	—	1.14
14	2,000,000	—	—	—	—	2,000,000	1,750,000	—	—	—	—	1.14
15	2,000,000	—	—	—	—	2,000,000	1,750,000	—	—	—	—	1.14
16	2,000,000	—	—	—	—	2,000,000	1,750,000	—	—	—	—	1.14
17	2,000,000	—	—	—	—	2,000,000	1,750,000	—	—	—	—	1.14
18	2,000,000	—	—	—	—	2,000,000	1,750,000	—	—	—	—	1.14
19	2,000,000	—	—	—	—	2,000,000	1,750,000	—	—	—	—	1.14
20	2,000,000	—	—	—	—	2,000,000	1,750,000	—	—	—	—	1.14

[a]Assumes stress period occurs in the first four years of a program's life. Fitch typically applies stresses over the first, middle and last four years of a program's life. [b]Equals 100% divided by number of stress periods (typically four years). [c]Equals Remaining Obligor Payments at the beginning of the stress period times Annual Default Timing Allocation times the Break-Even Default Tolerance Rate. [d]Equals Total Defaulted Obligor Payments times (1 minus the Recovery Rate [90%]). [e]Equals Schedule of Obligor Payments minus Total Losses. [f]Equals Obligor Payment Collections – Post Stress minus Schedule Debt Service Payments. [g]Equals Debt Service Shortfall. [h]Equals Beginning Reserve Balance minus Use of Reserve Fund. [i]Equals Obligor Payment Collections - Post Stress plus Use of Reserve Fund divided by Schedule Debt Service Payments.
Source: Fitch Ratings.

Addendum C: Checklist of Basic Document and Data Requests

The following is requested for all ratings:

- Current portfolio composition, including any public parity rating and watch status, security pledge type, lien status amount(s) outstanding and term. This information should be entered into Fitch's latest PSM.
  - Multiple parity obligations to a single obligor should be consolidated with maximum or weighted average term cited.
  - Similarly, senior, junior and/or subordinate obligations are also to be combined, with the rating of the most junior obligation utilized.
  - Double-barrel pledges (i.e. revenue and general obligation) should include any public parity rating. If both pledges are publicly rated, the higher of the two should be entered.
- Underlying obligor information for certain unrated entities, as requested by Fitch, including three years of audited financial statements, credit application, current and historical (five-year) obligor delinquencies and defaults.
- Current and historical (five-year) reserve account balances and details on lower than expected investment earnings.
- Default tolerance analysis (typically, the maximum default rate that can be sustained for the first, middle and last four-year periods of the cash flows).
- Details of significant changes to the program, such as changes in executive management and/or program directives.

In addition to the above, the following is requested for new ratings:

- Preliminary official statement.
- Relevant legal documents including a trust agreement or indenture, sample underwriting agreements for any new obligors, an authorizing resolution, supplementary indentures and legal enforceability opinions.

The ratings above were solicited and assigned or maintained at the request of the rated entity/issuer or a related third party. Any exceptions follow below.