Integrated Planning in Action

Adapting for Success

EPA's Integrated Municipal Stormwater and Wastewater Planning Approach Framework helps municipalities meet clean water goals while prioritizing infrastructure investments with the greatest water quality improvements and community benefits. The Framework lays out a comprehensive, yet flexible planning process based on a set of overarching principles. EPA created a series of fact sheets—including this one—to inform municipalities interested in integrated planning.

This fact sheet provides recommendations for developing a process to adapt for success. Adapting is critical for any infrastructure investment in an integrated plan—particularly investments that span a long period during which a municipality may encounter changing conditions such as population growth, increased storm intensity and frequency, land-use changes, or new permit requirements. Through adaptive management, a municipality evaluates progress regularly and can pivot if projects are not performing as expected or circumstances change.

Each integrated plan should describe how adaptive management will be used during implementation, as described in Elements 5 and 6 of the Framework. Integrated plans should be assessed at a predetermined frequency to ensure that the selected projects continue to align with overall community goals and achieve the desired water quality and human health benefits.

Determine performance metrics.

Early in the integrated planning process, the municipality should develop objectives that describe how it will achieve broader plan goals within a particular timeframe and the metrics to meet these objectives. These objectives should be SMART—specific, measurable, attainable, realistic, and time-based. Developing SMART objectives will help the municipality achieve infrastructure and water quality goals to be addressed through integrated planning.

The municipality should also develop SMART metrics to track progress over time. Examples of SMART metrics include:

- Annual pollutant load reductions from installed stormwater control measures
- Percentage or volume of combined sewer overflows (CSOs) reduced

Goal

- A broad, qualitative statement of *desired achievements*
- Example: reduce the number of CSOs

Objective

- A specific, *measurable statement* of what will be done to achieve goals within a particular time frame
- Example: reduce the discharged CSO volume by 50 percent by 2025

Strategy

- A general approach or method: *how* the municipality plans to achieve objectives and resolve issues
- Examples: eliminate connected roof drains to reduce infiltration and inflow, install green infrastructure to retain runoff, build underground storage

- Acres of land conservation or reforested land cover planted
- Acres of disconnected impervious areas that are treated by green infrastructure
- Reduction of bacteria/nutrients/sediment loading compared with an established baseline

Develop an approach for monitoring progress.

As described in Element 5 of the Framework, the municipality should develop a monitoring plan to gather data it needs to calculate progress or update and fine-tune pollutant loading models that can estimate progress toward objectives. The plan should establish:

- Monitoring parameters associated with metrics
- Monitoring location and frequency
- Sampling protocols
- Analytical methods
- A quality assurance project plan

> **"It seems absolutely fundamental to be able to adjust your priorities as findings change and new priorities arise"**
>
> —Dave Stewart, Director of Engineering, Harrisburg, Pennsylvania, Capital Region Water

Determining the appropriate monitoring and/or modeling approaches will depend on the types of regulated sources in the plan, permit requirements, types of projects being implemented in the plan, and the staff and budget available. For more guidance on how to develop a monitoring plan, visit:

- *Discharge monitoring report guidance for stormwater general permit holders*
- *Industrial Stormwater Monitoring and Sampling Guide*
- *POTW's Procedures for Conducting Compliance Monitoring*
- *Guidance for Quality Assurance Project Plans*
- *Combined Sewer Overflows: Guidance for Monitoring and Modeling*
- *CSO Post Construction Monitoring Guidance*
- *Reviews of Representative Stream Assessment and Mitigation Protocols*
- *Rapid Assessment Protocols for Use in Streams and Wadeable Rivers*

The municipality should make a plan that addresses training requirements for staff, safety during monitoring, and ensuring an adequate budget. It may be useful to spread responsibilities across departments or recruit external help (e.g., from local universities). The municipality should develop a realistic monitoring frequency, one that will gather enough data while fitting the budget.

Identify and prevent any barriers to implementation.

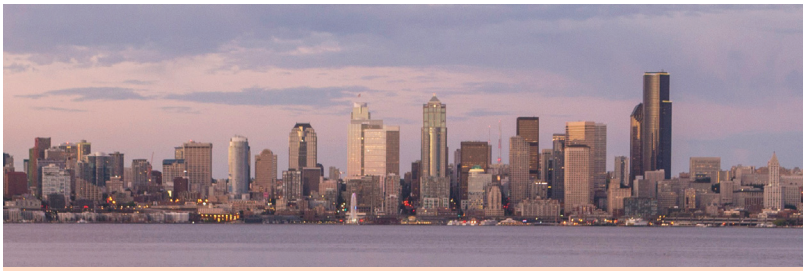
Implementing an integrated plan requires time and resource investments over the entire plan schedule. When developing the plan, the municipality should anticipate barriers to evaluating it and updating it in the future. Factors to consider include resources, staffing, and communication between departments or outside entities—if multiple groups are collecting and analyzing monitoring data and writing plan updates, they will

Columbus, Ohio

The City of Columbus, Ohio, partnered with Ohio State University to measure the water quality and quantity impacts from its green infrastructure projects in a control area.

need to coordinate with each other. For example, they could hold periodic check-ins and use a shared drive or online database. The municipality should account for these types of challenges when designing the adaptive management process.

Once the municipality has started implementing the integrated plan and monitoring approach, it should continuously evaluate the approach and be prepared to make changes if needed. This could include checking periodically that the plan is on schedule, holding regular staffing meetings, and tracking budget closely throughout the process. Adjustments may include changing sampling locations, providing more training for staff, or updating standard operating procedures.



Seattle, Washington

The City of Seattle, Washington, developed a four-step monitoring approach to determine pollutant reduction effectiveness of bioretention facilities:

1. Continuously monitor flow
2. Monitor water quality by sampling during storm events
3. Use flow data to model flow volumes for facilities not monitored
4. Calculate an average pollutant load reduction for all facilities

Characterize progress.

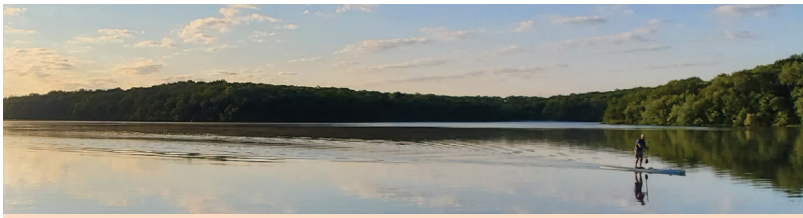
A municipality should have a plan for evaluating monitoring data and using these data to describe progress toward goals or to estimate progress with appropriate models. If the municipality used modeling to evaluate projects or choose alternatives when developing the plan, it should consider how it will update the models throughout the plan period and use the data to adapt. Post-construction monitoring data can be used to recalibrate models and compare actual outcomes with anticipated outcomes. The municipality should prepare a strategy to update the plan if the benefits are not comparable or the models show that goals have not been met.

EPA has several publicly available tools that a municipality can use to estimate progress:

- Storm Water Management Model
- National Stormwater Calculator
- Watershed Management Optimization Support Tool
- Green Infrastructure Modeling Toolkit
- Assessment, Total Maximum Daily Load Tracking and Implementation System (ATTAINS)
- Water Quality Portal Data Discovery Tool

Adapt and communicate integrated plan implementation.

As described in Element 6 of the Framework, the municipality should have a process for improving the plan over time. It should consider how to use monitoring data to adapt the plan's projects and schedule to continue working toward goals. Additional inputs, such as changes in rainfall intensities or population density, should also factor into updates to the projects or schedule as appropriate. The municipality may also want to consider updating stakeholders on progress



Johnson County, Kansas

Johnson County, Kansas, began its 25-year schedule with a five-year action plan to implement near-term projects while gathering more data to guide future improvements. The county will use these project phases to keep stakeholders engaged and incorporate their feedback in future plan iterations.

Richmond, Virginia

The City of Richmond, Virginia's integrated permit consolidated annual reporting requirements for the city's combined sewer system and storm sewer into a single annual report submitted to the Virginia Department of Environmental Quality. The report must include activities and monitoring results for the past year, as well as projects planned for the next year.

to sustain support and solicit input on how the integrated plan should be revised. Permitting authorities typically require annual updates on plan progress, but it may be appropriate to do more in-depth assessments less often depending on the schedule of projects. Some integrated plans will have extended planning horizons, so it is important that municipalities incorporate adaptive management activities into project implementation that may not align with permit terms. The municipality should make sure to communicate updates to the plan with the permitting authority, either through required reporting or additional meetings for more substantive or longer-term changes.

For more information, please visit EPA's Integrated Planning website.
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