

Prioritizing Wastewater and Stormwater Projects Using Stakeholder Input

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Cover photos: City of Santa Maria, Department of Utilities (top left); Barry Tonning, Tetra Tech (top right)

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1 INTRODUCTION

Many communities face complex challenges operating their wastewater and stormwater infrastructure, including meeting Clean Water Act (CWA) obligations under financial constraints. Communities with multiple CWA obligations for their wastewater treatment plants (WWTPs), sewer systems and stormwater infrastructure must prioritize their investments. In addition, they must evaluate different approaches and options for improving their systems, including gray, green and data infrastructure investments.

Integrated planning is the process of systematically identifying and prioritizing actions and projects to meet CWA obligations. EPA released the Integrated Municipal Stormwater and Wastewater Planning Approach Framework[1] to provide guidance on developing integrated plans. The framework identifies the operating principles and essential elements of an integrated plan. It also encourages communities to work with stakeholders to identify and evaluate options to respond to CWA requirements.

This report describes how communities can use stakeholder input to select and rank criteria and apply those criteria to prioritize stormwater and wastewater projects. Three case studies illustrate this process.

What's in This Document?

Section 2 presents an overview of processes for prioritizing wastewater and stormwater projects.

Section 3 describes ways to select and rank criteria using stakeholder input.

Section 4 discusses how to rank criteria and apply them to decision-making.

Section 5 presents three case studies of communities that have used stakeholder input to prioritize projects: Burlington, Vermont; Onondaga County, New York; and Santa Maria, California.

A sample decision support tool for scoring projects, "Using Stakeholder Input to Evaluate and Rank Alternatives – Basic Decision-Making Spreadsheet Tool," is available as a separate file at https://www.epa.gov/npdes/integrated-planning-municipal-stormwater-and-wastewater#resources

[1] For more information, visit http://www.epa.gov/npdes/integrated-planning-municipal-stormwater-and-wastewater.

2 OVERVIEW OF DECISION-MAKING PROCESSES

EPA encourages communities to give stakeholders appropriate opportunities for meaningful input during the identification, evaluation and selection of alternatives. This includes input on identifying and evaluating decision-making approaches.

The community should evaluate diverse factors and compare potential projects when deciding which wastewater or stormwater management project(s) to initiate. These factors could include—but are not limited to—water quality improvement, quantity and cost of pollutant load reduced, public amenities and public support.

Many approaches are available to guide this complex decision-making. In general, successful decision-making processes include the following steps:

1. Ensure upfront and continuing involvement of stakeholders
2. Develop goals and objectives
3. Identify projects that would advance progress toward the goals and objectives
4. Choose criteria for evaluating projects
5. Consider weighting the criteria (optional)
6. Apply criteria to identify priority projects

Downspout disconnection and flow dispersal for infiltration in Syracuse help reduce stormwater volumes that exacerbate CSOs and contribute to "flashy" runoff episodes. *Barry Tonning, Tetra Tech*

Engaging key stakeholders is vital to understanding what's important to the local community.

The criteria that help characterize potential outcomes of projects and actions may be qualitative, semi-quantitative or quantitative. If they are quantitative, data sets and computer simulations can be used to measure the criteria for each action.

One decision-making approach, called multi-criteria decision analysis, involves using multiple criteria to compare potential projects and actions. Stakeholders are typically involved throughout the process to both identify relevant criteria and apply criteria to potential projects.

A multi-criteria decision analysis might be used to identify several high-priority projects; then a more focused analysis, such as a benefit-cost analysis, might be conducted on each priority project to choose the highest priority.

3 IDENTIFYING CRITERIA FOR PROJECT EVALUATION

Identifying criteria that reflect a community's goals and objectives is key to evaluating and comparing project alternatives. For example, a community may have a goal of minimizing flood hazards to life and property. Peak flow reduction as a criterion would help identify projects that would directly contribute to this goal.

Goals and objectives may include broader benefits for the community. A community might consider the "triple bottom line" of environmental, economic and social criteria as illustrated in Figure 1. Table 1 lists potential criteria for a triple bottom line approach.

Criteria should be locally specific and developed with the involvement of key stakeholders. The choice of criteria will also be influenced by the priorities of the wastewater/stormwater utility (e.g., capital costs, maintenance, permit compliance, asset management) and external concerns such as job creation, environmental impacts and property valuation.

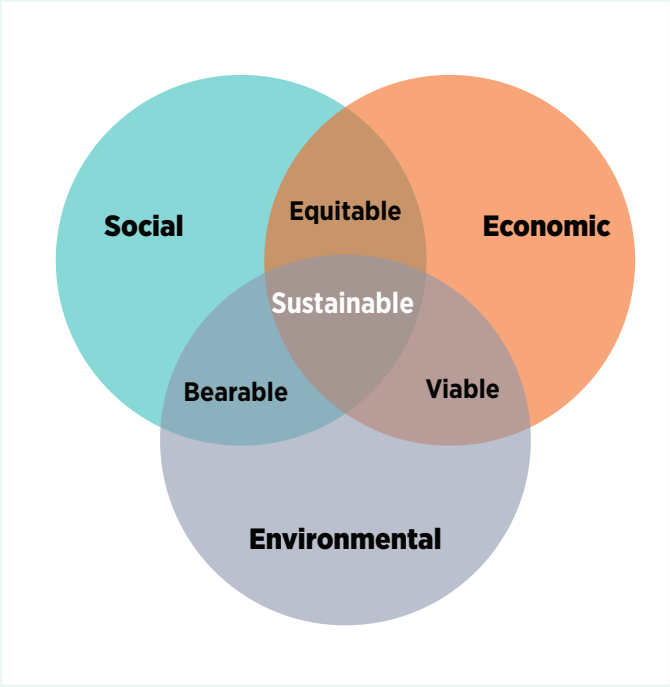
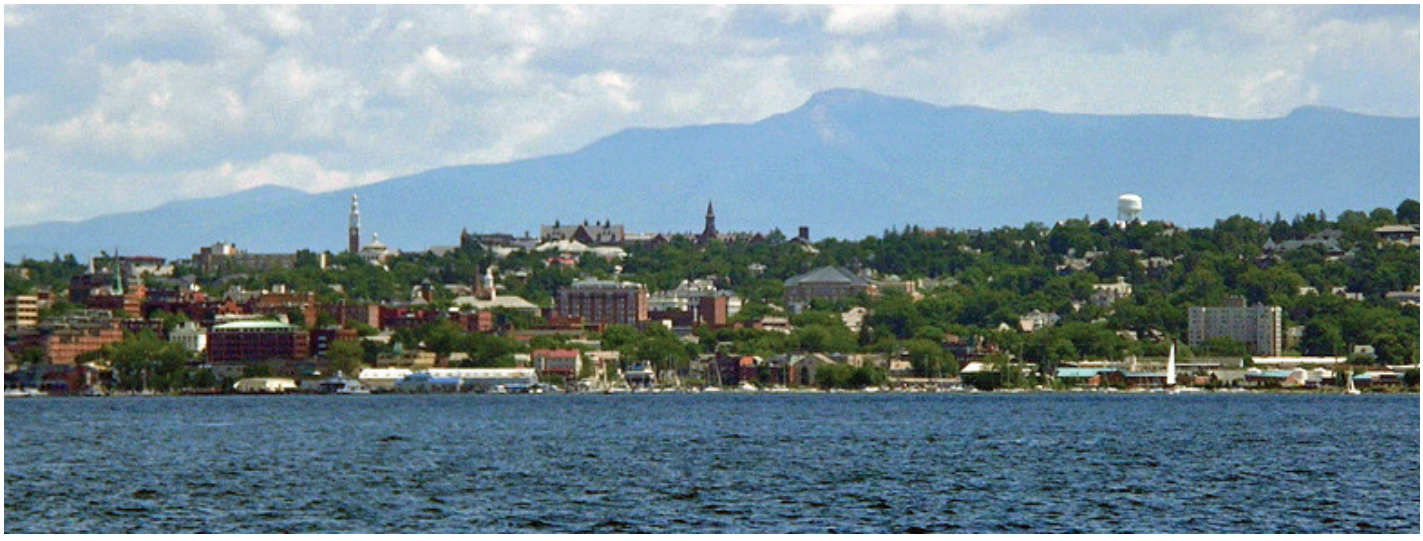


Figure 1. Environmental, economic and social criteria groupings and relationships. *Source: WE&RF Product No. DEC3R06, Distributed Water Infrastructure for Sustainable Communities: A Guide for Decision-Makers*



Burlington (and other cities facing multiple wastewater or stormwater issues) may consider an integrated approach to project evaluation, selection and implementation. *Dicky Hayward – Flickr, CC BY 2.0, https://commons.wikimedia.org/w/index.php?curid=6396407*

Table 1. Examples of criteria for water infrastructure project selection

Economic	Environmental	Societal
Maximize Economic Value	**Optimize Environmental Benefit**	**Fulfill Community Objectives**
Minimize capital costs • Planning and design • Land • Phasing • Existing treatment • Existing collection • Financing	**Water quality** • Avoidance • Removal	**Quality of life** • Health • Outdoor environment • Built environment
Minimize operating costs • Financing cost • Labor • Power • Byproducts • Other	**Water quantity** • Water balance • Sustain flow	**Stability** • Dependable • Resilient • Safe
Meet community economic needs • Availability • Adaptability • Externalities	**Natural environment** • Biodiversity • Disturbance • Global warming	**Equitability** • Serves all equally • Charges everyone fairly

This is not intended to be a complete list of all criteria.

Source: WE&RF Product No. DEC3R06, Distributed Water Infrastructure for Sustainable Communities: A Guide for Decision-Makers

4 RANKING AND APPLYING PROJECT EVALUATION CRITERIA

The perceived importance of evaluation criteria will vary among stakeholders. For example, residents living near a potential site for a new WWTP may be concerned about construction and long-term impacts (e.g., noise, odors, traffic) much more than water quality improvements or cost. Other stakeholders may consider water quality their highest concern. It is critical to engage representative stakeholders.

Worksheet #1 (see page 6) presents an approach to ranking the criteria that the community has identified as important.

Planners can conduct scoping-level reviews of proposed projects and actions using the preferred criteria, and produce an initial comparison to determine how proposed alternatives stack up. Figure 2, for example, shows a comparison of centralized versus decentralized wastewater treatment alternatives using criteria for maximizing economic value, optimizing environmental benefits, and fulfilling community objectives.

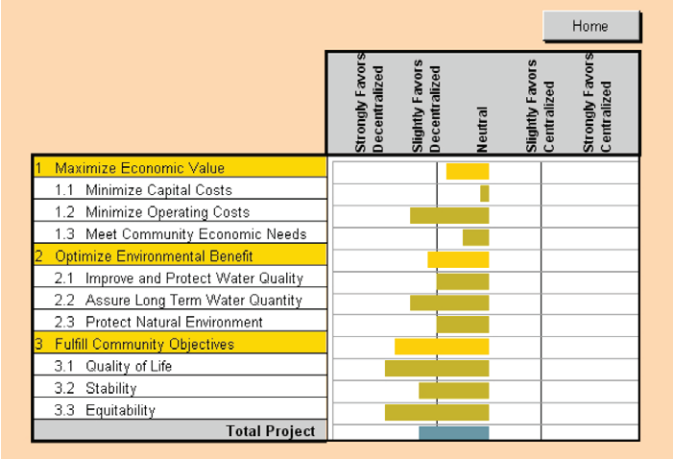


Figure 2. Decision model results: scoping-level analysis of decentralized vs. centralized alternatives using selected evaluation criteria. *Source: WE&RF Product No. DEC3R06, Distributed Water Infrastructure for Sustainable Communities: A Guide for Decision-Makers*

Stormwater infiltration swale near Onondaga Lake. Stakeholders may prefer the aesthetic improvements associated with "green" solutions to combined sewer overflow management, rather than underground sewer separation projects. *Barry Tonning, Tetra Tech*

To help prioritize alternatives, a community can assign weights to the selected criteria, to reflect the relative importance to the community of each criterion. Planners might have several alternatives that are expected to rise to the top of any prioritization. In that case, weighting should reflect stakeholder priorities. Often a simple review of several weighting schemes, including an option for no weighting, allows stakeholders to provide feedback on the best way to prioritize criteria. Simple weighting schemes tend to work best so that methods and results can be easily interpreted.

Worksheet #2 (see page 7) provides an example of how stakeholders can assign weights to criteria.

To help communities score proposed projects using the criteria they choose, EPA has developed a basic Excel-based decision support tool, "Using Stakeholder Input to Evaluate and Rank Alternatives – Basic Decision-Making Spreadsheet Tool," available online at https://www.epa.gov/npdes/integrated-planning-municipal-stormwater-and-wastewater#resources. The spreadsheet allows users to weight criteria, score projects and see score results according to the criteria and community goals.

Integrated Planning Worksheet #1: Prioritizing Project Evaluation Criteria

A key part of integrated wastewater and stormwater planning is evaluating new projects. You can help in this important work by ranking various evaluation criteria using the table below. Please **review the evaluation criteria** and the details and examples that go with them. Then **rank the criteria** according to your priorities—with 1 the highest priority and 15 the lowest—through the entire list below.

Priority Ranking: 1 (Highest) Through 15 (Lowest	Criteria Used to Evaluate Projects	Details and Examples
	Availability of assistance	Grants, loans or other programs are available to cover some capital costs, land acquisition, etc.
	Resilience	Project can withstand extreme weather events/changes over the long term
	Low to moderate costs for construction or implementation	Project implementation costs to ratepayers in terms of cost per gallon for treatment or cost per pound of pollutant removed is low to moderate
	Low to moderate costs for maintenance	Maintenance cost to ratepayers, per gallon or per pound of pollutant removed, is low to moderate
	Low to moderate costs for operation	Operation cost to ratepayers, per gallon or per pound of pollutant removed, is low to moderate
	Environmental performance	Project will measurably reduce pollutant discharges and/or improve receiving water quality
	Flooding mitigation	Project eliminates or reduces flooding in residential, commercial or other areas
	Lack of disruptions during construction	No or few traffic disruptions, dust, noise or other impacts during the project construction period
	Low-profile operation	Project has a low visual profile and low/no odors, noise or other operational nuisances
	Operational stability and resilience	Project can handle diverse flows and pollutant loads, and has a low failure risk and high reliability
	Partnerships in project implementation	Outside parties are willing to cost-share or otherwise help with construction, operation, maintenance, etc.
	Positive economic and employment impact	Project creates positive economic impact and local jobs during construction and operation
	Positive visibility and community relations	Project enhances the city's image and relationships within the community
	Quality of life enhancements	Project fits into greenway, park, recreation, ecosystem restoration, transportation, other plans
	Sustainability support	Project meets overall sustainability goals: energy use, materials, environmental footprint, etc.

Integrated Planning Worksheet #2: Assigning Weights to Project Evaluation Criteria

Rather than the "Priority Ranking" column from Worksheet #1, the table below has a "% Weight" column to the right. Please revisit your discussion on prioritizing the various criteria, and think about this question: **how much weight should each criterion get during project evaluation?** Indicate a weight for each criterion—that is, the percentage you think it should count for during a project review. For example, if you think "Costs for construction or implementation" should count for half the total score, write "50%" in the "% Weight" column (50 percent is half of 100 percent). You can enter low percentages—even 0 percent—for criteria you don't think are very important. After you finish entering the percentages, they should add up to 100.

Criteria Used to Evaluate Projects	Details and Examples	% Weight
Availability of assistance	Grants, loans or other programs are available to cover some capital costs, land acquisition, etc.	
Resilience	Project can withstand extreme weather events/changes over the long term	
Low to moderate costs for construction or implementation	Project implementation costs to ratepayers in terms of cost per gallon for treatment or cost per pound of pollutant removed is low to moderate	
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Quality of life enhancements	Project fits into greenway, park, recreation, ecosystem restoration, transportation, other plans	
Sustainability support	Project meets overall sustainability goals: energy use, materials, environmental footprint, etc.	
Total (percentages should add up to 100%)		**100%**

5 CASE STUDIES

The three community case studies featured in this section— Burlington, Vermont; Onondaga County, New York; and Santa Maria, California— illustrate the process of identifying and evaluating alternatives with stakeholder participation. Each of these communities is unique, but all are facing the challenge of managing wastewater and stormwater through affordable, sustainable, legally compliant approaches. The following sections summarize how each community approached identifying which programs or projects would best help meet local objectives.

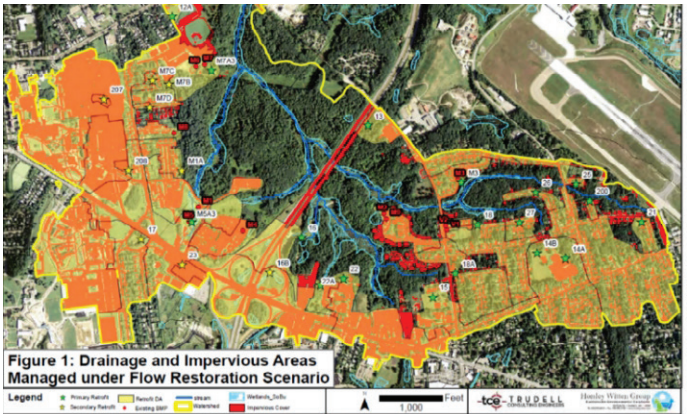
5.1 Burlington, Vermont

5.1.1 Introduction and Background

Burlington is the largest municipality in Vermont, with a population of 42,000. It is located on the shores of Lake Champlain.

The city operates three WWTPs. The National Pollutant Discharge Elimination System (NPDES) permits for the three WWTPs provide phosphorus effluent limitations, with the north and east plants currently set at 0.8 milligrams per liter and the main plant set at 0.6 milligrams per liter. These limits are dictated by a local total maximum daily load (TMDL) for phosphorus.

Burlington has both separate and combined sewer areas. *City of Burlington*



The city of Burlington is considering options for restoring flows in several local streams considered impaired due to poor aquatic habitat, exacerbated by "flashy" urban runoff. *Trudell Engineers, Horsley Witten Group*

Most of the community is served by combined sewers, which convey both wastewater and stormwater. The city made efforts in the 1980s and during 2010–2012 to eliminate and/or bring many of the combined sewer overflow (CSO) discharge locations into compliance with the Vermont CSO policy.[2] The city currently has only a few remaining CSO outfalls. Basement backups have been on the rise recently due to increasing frequency of intense storms.

Burlington operates a municipal separate storm sewer system (MS4) in portions of the city that are not connected to the combined sewer system. The current NPDES permit for discharges from the MS4 requires the city to develop and implement flow restoration plans for impaired watersheds in order to maintain compliance with a bacterial wasteload allocation and contribute to the achievement of the bacteria TMDL for Englesby Brook, a tributary to Lake Champlain. Further, EPA recently revised the Lake Champlain phosphorus TMDL, which will result in more stringent regulatory requirements for Burlington.

[2] Accessible online at http://dec.vermont.gov/watershed/wastewater/discharge-permits.

The city has created a stormwater utility that provides a sustainable funding source for stormwater management; it expects substantial rate increases to meet the revised Lake Champlain TMDL and provide further program enhancements.

5.1.2 Identifying Stormwater and Wastewater Issues

Going into the integrated planning process, the city knew that a primary focus of the plan would be phosphorus reduction at the main plant WWTP. The community explored a number of potential projects to address this issue (see Section 5.1.3).

The city conducted an online poll to assess community concerns about stormwater and wastewater issues. The poll was open to the public, posted to the city's stormwater website, and advertised through direct emails and news media. Poll respondents were asked how concerned they were (from "very concerned" to "not concerned") about a set of stormwater and wastewater issues. The results did not indicate significant scoring variability, but did provide information about the relative importance of the issues to respondents. Table 2, below, summarizes the results of the poll.

Stormwater outfall near a popular recreational beach on Lake Champlain in Burlington. *Barry Tonning, Tetra Tech*

Table 2. Burlington online poll scoring on water quality issues

Rank	Stormwater and Wastewater Issues	Score
1	General pollution of our waterway ecosystems (lakes, rivers, streams) due to pollutants (sediment, oils/grease, bacteria, nutrients, thermal) in urban stormwater runoff	10%
2	Combined sewer overflows (release of untreated mixture of stormwater and wastewater-sewage) to the Winooski River and the Intervale Wetlands during intense or large storm events due to excess stormwater from impervious surfaces	10%
3	Beach closures due to E. coli bacteria (stormwater runoff of pet/wildlife fecal matter)	9%
4	Release of PARTIALLY TREATED stormwater and wastewater from our Main Wastewater Treatment Plant during large storm events due to excess stormwater from impervious surfaces	9%
5	Blue green algae blooms in the Lake in general (not necessarily beach closures) which can affect ecosystem health and Lake recreation and tourism	9%
6	Beach closures due to blue green algae (phosphorus pollution)	9%
7	Sediment runoff from construction projects during storm events	7%
8	Acute and/or toxic levels of chloride in local small streams due to winter salting of roadways and sidewalks	8%
9	Localized flooding due to undersized stormwater management infrastructure	8%
10	Stream bank erosion and loss of fish habitat in our small local streams (Englesby, Centennial, Potash Brooks) due to excess volumes of stormwater runoff	8%
11	Basement flooding (where a mixture of sewage and stormwater surcharges into basements with plumbing fixtures) due to combined sewer surcharges caused by excess stormwater runoff from impervious surfaces	7%
12	Condition of our collection system infrastructure (wastewater and stormwater pipes and stormwater outfalls)	8%

5.1.3 Identifying Potential Projects

To explore possibilities for reducing phosphorus in the main plant WWTP effluent, the city used contractor support to conduct an analysis at the facility. The analysis considered treatment process adjustments, increased sampling to further characterize and understand wastewater quality at various points in the treatment plant, and alternative ways to handle and process treatment residuals. Other potential projects evaluated at the scoping level included stormwater management and flow restoration.

Burlington officials generated a list of projects proposed for implementation during the next few years. The list (see text box below) was based on previous planning and ongoing efforts, as well as best professional judgment on how to address the community's stormwater and wastewater issues.

5.1.4 Developing and Selecting Criteria

The city of Burlington gathered stakeholder input on the community's priority water quality issues and preferred criteria through three activities:

- **Neighborhood meetings.** The city held meetings with neighborhood associations and the public to educate community members about integrated planning and to learn their views on water quality, wastewater treatment and stormwater management.
- **An online poll for neighborhood groups and the general public.** The city used this poll (also described in Section 5.1.2) to assess respondents' general concerns about water quality issues and to prioritize criteria. The poll was posted to the city's stormwater

Burlington stakeholders at the August 2015 integrated planning meeting. Input was used to identify, choose and weight project evaluation criteria. *Jonathan Smith, Tetra Tech*

Potential Projects: Burlington, Vermont

1. WWTP phosphorus upgrade
2. WWTP phosphorus optimization
3. Combined sewage storage—Perkins Pier
4. Combined sewer tunnel—Battery Street
5. Distributed storage vault system, based on tiered flow control
6. Residential rooftop disconnection

7a. Green Streets Initiative—CSS

7b. Green Streets Initiative—MS4

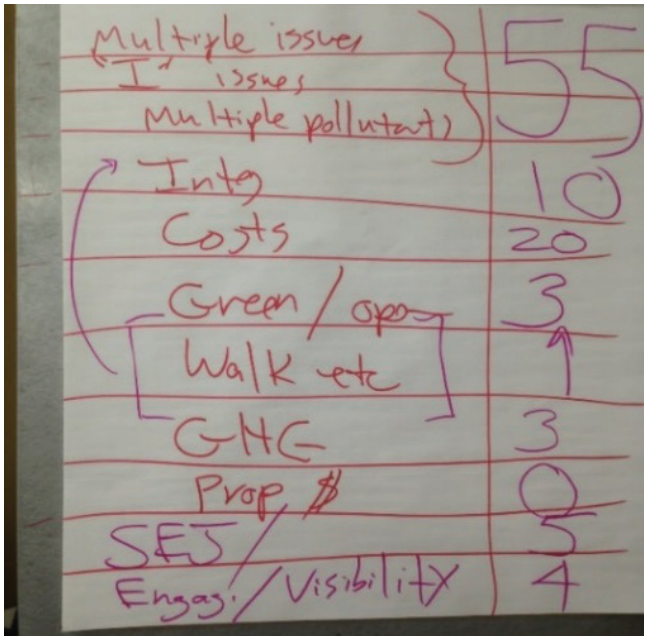
8a. Retrofits of public property (parks, schools, city buildings)—CSS

8b. Retrofits of public property (parks, schools, city buildings)—MS4

9. Enhanced post-construction regulatory requirements
10. Private property retrofit incentive program
11. Pet waste cleanup
12. Dirty driveway mitigation
13. Flow restoration plan BMP implementation
14. Outfall repair
15. Enhanced street sweeping
16. CIPP lining
17. Enhanced catch basin cleaning/pipe cleaning
18. Improved snow fighting (Brine Systems)
19. Riparian/stream channel restoration

website and advertised through direct emails and news media. Poll respondents were asked to rank criteria (from "most important" to "not important"). The poll did not force respondents to allocate concern or importance proportionally, but rather to rank criteria nominally. The results did show how the community ranked the nine criteria in the poll, though the difference between the highest- and lowest-ranked criteria was not large (see Table 3).

- **A facilitated meeting of internal and external stakeholder group representatives.** The city held a final meeting, open to the public, to present the stakeholder input and discuss how/if the criteria should be further refined for use in a decision tool. During the meeting, participants were split into two groups to further discuss the criteria and consider how they would weigh the relative importance of the criteria. The exercise helped confirm the importance of environmental performance and life cycle costs as key criteria, but also uncovered supplemental benefits and issues important to subsets of both breakout groups. For example, social and environmental justice, walkability/bike-ability, and green space features were identified as criteria that should be considered in any project/program analysis.



Score sheet from a stakeholder meeting breakout group. *Barry Tonning, Tetra Tech*

Table 3. Burlington online poll scoring on criteria preferences

Rank	Stormwater and Wastewater Issues	Score
1	Addresses multiple water resource issues at the same time	13%
2	Addresses the water resource issues *I* feel are most critical as identified above	12%
3	Removes multiple pollutants at the same time (for example, a project that targets removal of multiple pollutants vs. only phosphorus removal)	12%
4	Integrated with other upcoming city infrastructure projects such as streets/road projects, parks improvements, public building improvements	12%
5	Costs to build, operate and maintain the project compared to amount of a pollutant removed	12%
6	Increases green/open space in the urban environment	11%
7	Improves walkability and bike-ability of streetscape	10%
8	Provides green-house gas reduction benefits	10%
9	Increases local property values/storefront value through improved aesthetics	8%
	Total	**100%**

The text box below presents the criteria derived from online poll respondents and workshop/meeting participants.

Project Evaluation Criteria: Burlington, Vermont

- Ability to reduce the phosphorus load
- Ability to reduce the sediment load
- Ability to reduce the bacteria load
- Ability to reduce untreated CSOs or wet-weather events at the WWTP
- Potential to address regulatory requirements
- Potential to address local/neighborhood flooding or combined sewer basement backups
- Ability to address top priorities of stakeholder groups (e.g., reduced urban runoff, CSO reduction)
- Operations and maintenance intensity
- Level of water quality performance certainty
- Scalability
- Ability to address more than one water quality issue
- Relative capital cost
- Visibility and/or catalyzes engagement and collaboration
- Ability to integrate with existing projects
- Accessible green/open space impacts
- Socio-economic equity impacts
- Impacts walkability/bike-ability
- Greenhouse gas impacts
- Energy consumption
- Reduced infrastructure deficit/increased infrastructure resilience

5.1.5 Applying Criteria

Stakeholder input outcomes were used to construct an Excel spreadsheet containing the criteria and a scoring mechanism. The spreadsheet was used to:

1. Rank proposed wastewater and stormwater projects to determine which projects should be considered further.
2. Use the cost/pollutant loading data, generated during the analysis phase, to determine benefit-cost ratios for each project. The benefit-cost ratios were used to create the implementation schedule for the integrated plan.
3. Prioritize individual projects based on site-specific conditions (e.g., frequency of flooding).

The city has already used the selected criteria to further assess the viability of some of the potential projects. Additional projects will be evaluated as the integrated planning process continues.

5.2 Onondaga County, New York

5.2.1 Introduction and Background

Onondaga County, located in central New York, has a population of about 467,026 according to the 2010 U.S. census. The city of Syracuse is the county seat.

Onondaga Lake, the receiving water for most stormwater and wastewater discharges in Onondaga County, was once known as one of the most polluted lakes in North America due to many decades of industrial, municipal, agricultural and other impacts. But its water quality has been

Green roof in the combined sewer area of downtown Syracuse. A wide range of stormwater projects in this area have reduced CSO overflow events and volumes in recent years. *Barry Tonning, Tetra Tech*

improving over the past three decades, and it is now on the road to recovery.

Over the past 20 years, the Onondaga Lake Partnership, which includes local, state and federal partners, has worked to improve the water quality of the lake. Its activities have included improving wastewater treatment at the main Metropolitan WWTP, reducing CSOs, improving management of industrial facilities, cleaning up hazardous waste sites, installing groundwater separation barriers, restoring targeted shoreline and aquatic habitat areas, and ensuring better management of polluted runoff from urban, residential and agricultural areas.

Results of Previous Efforts to Improve Onondaga Lake Water Quality

- About 95 percent of CSO flows have been eliminated through previous efforts.
- Operational CSO outfalls have been reduced from 72 in 1998 to 46 in 2014.
- More than 175 green infrastructure projects have been funded over the past six years by the county's landmark "Save the Rain" program.
- Ammonia and phosphorus discharges to the lake from the Metropolitan WWTP have been reduced by 98 percent and 80 percent, respectively.
- Bacteria and mercury levels in the lake are declining.
- Ammonia concentrations have met standards for aquatic life use protection, and phosphorus levels now average just above 20 micrograms per liter—the state guidance value.
- No major algal blooms have been observed since 2007.
- Bacteria and dissolved oxygen levels are approaching the numeric criterion in most locations.

5.2.2 Identifying Stormwater and Wastewater Issues

Continued efforts to restore Onondaga Lake have become increasingly difficult, due to:

- Elimination of most of the "low-hanging fruit" opportunities for remediation/restoration.
- Higher costs associated with achieving pollution abatement benefits.
- The engineering and technical challenges associated with the wide range of pollutant sources.

Pollutant sources may include sediment from mudboils,[3] stormwater impacts from urbanized areas, nutrient runoff from agricultural operations, remaining CSOs, remaining waste sites to be remediated, and WWTP effluent.

There are three main regulatory drivers for addressing the Onondaga Lake water quality challenges:

1. Implementation of the TMDL for phosphorus reductions in Onondaga Lake, which will lead to phosphorus discharge reductions at the Metropolitan WWTP.
2. CSO requirements in permits to be issued by the New York State Department of Environmental Conservation.
3. Fish consumption advisories caused by the remaining sources of mercury, PCBs, dioxin and other contaminants associated with past waste disposal practices.

In its planning, the Onondaga County Department of Water Environment Protection (OCDWEP) is focusing on further phosphorus reductions from permitted and other sources, and increasingly stringent NPDES effluent limitations at the Metropolitan WWTP. The phosphorus TMDL issued by the state in 2013 calls for significant phosphorus load reductions from the Metropolitan WWTP,

[3] Mudboils are composed of water, liquefied sediments and dissolved mineral salts that bubble up through vents in the Earth's surface due to localized land subsidence activity and persistent groundwater pressure.

The Onondaga County Executive has been widely recognized for aggressively pursuing green infrastructure to abate CSOs and manage stormwater.

CSO discharges, MS4s and agricultural areas. The TMDL requires phosphorus load reductions of 15 percent and 44 percent for Metro outfalls #1 and #2, respectively; 39 percent for CSO discharges; 18 percent for discharges from MS4s; and 18 percent for agricultural areas. In addition to these more stringent phosphorus requirements, there is the possibility of more stringent requirements to reduce bacteria, sediment, metals, phenols and other pollutants from these sources.

5.2.3 Identifying Potential Projects

Onondaga County began exploring an integrated wastewater and stormwater planning approach in 2014 with robust stakeholder input. In June 2015, the county used contractor support to assess its water issues and approaches to wastewater and stormwater management. The assessment included interviews, discussions and exchanges with a wide range of stakeholders. Based on the results, a list of potential projects was generated, shown in the text box to the right.

5.2.4 Developing and Choosing Criteria

In the next phase of the integrated planning process, the county identified key stakeholders; solicited input on which wastewater/stormwater criteria were most important to them through a discussion and survey; weighted the selected project review criteria; and assessed the potential for integrating wastewater, stormwater and other water resource management activities into a consolidated planning framework (see Table 4, Figure 3 and Figure 4). Stakeholders considered criteria such as environmental performance, life cycle costs and supplemental benefits. In discussions held in June and November 2015, stakeholders and agency staff recommended that

Potential Projects: Onondaga County, New York

4. Industrial waste site cleanup (i.e., dredging, removal and capping of contaminated material)
5. Expansion, upgrade, operation and management of stormwater and wastewater collection and treatment systems
6. Agricultural nonpoint source pollution abatement and sediment loading to Onondaga Creek and Onondaga Lake from the mudboils area
7. Green infrastructure CSO abatement projects (such as infiltration projects)
8. Working with the city of Syracuse to implement stormwater and tree ordinances
9. Stormwater pond retrofits
10. Development of treatment wetlands
11. Stabilizing of eroding channels
12. Public education on lawn and landscape maintenance and fertilization
13. Conversion of turf areas to native vegetation
14. Redirection of stormwater flows from impervious surfaces to pervious areas
15. A fully coordinated stormwater management program in the county
16. Expanding the Save the Rain grant funding to the farm sector
17. Stream restoration

Large stormwater treatment wetland installed by the "Save the Rain" program near Onondaga Lake. *Barry Tonning, Tetra Tech*

Onondaga stakeholders meeting to review draft project evaluation criteria. *Barry Tonning, Tetra Tech*

enhancements to the current wastewater and stormwater programs, further coordination of town and village MS4 efforts, and reduction in agricultural nonpoint source pollution be included as key elements of an integrated planning framework.

In developing a systematic process for considering project alternatives, OCDWEP chose to focus on a limited number of key stakeholders, recognizing 1) the size of the jurisdiction and the number of issues at play and 2) a less pressing need for immediate reaction to specific project options, since the utility's capital projects plan for the upcoming three-year period was already established.

Key stakeholders initially provided input on wastewater, stormwater and water resource management needs and current program operations via extensive phone interviews. Two meetings—one attended by key public- and private-sector stakeholders, another for local, state and EPA representatives—helped to refine the project evaluation approach. Both sessions solicited input from attendees on the types of criteria the county might use in evaluating the pros and cons of new management activities, and how the criteria should be prioritized and weighted.

A total of 21 people representing a wide range of water resource management interests attended the meeting for public and private stakeholders. The meeting included two breakout sessions: one to prioritize potential criteria, and another to assign weighting to the criteria, based on relative importance in decision-making (Table 4). Attendees completed individual scoring sheets for both the criteria priorities and weighting.

The evaluation criteria can be grouped into three categories: environmental and operational performance, life cycle costs, and supplemental benefits. Table 4 shows that criteria related to environmental and operational performance—environmental performance, operational stability and resilience, sustainability support, and quality of life enhancements—were the most important criteria overall, with a relative weight totaling 55 percent. Specific life-cycle cost criteria—construction, operation, maintenance, availability of assistance and partnerships for implementation—together totaled 22 percent. The remaining criteria, ranging from quality of life to economic and employment enhancements, made up the remaining 23 percent of the weighted values assigned by the stakeholder group..

The meeting for local, state and EPA representatives included staff from OCDWEP, the Onondaga County Office of the Environment, the Syracuse/Onondaga County Planning Agency, EPA Headquarters, EPA Region 2, NYSDEC Headquarters and NYSDEC Region 7. Participants 1) reviewed activities related to the possible development of an integrated wastewater and stormwater planning approach and 2) discussed criteria and weighting that could be used. In addition, meeting attendees individually provided input on how they would weigh criteria. Figure 4

Table 4. Stakeholder group weighting of criteria (percentages total 100%)

Average Ranking	% Weight	Criteria to Evaluate Projects	Details and Examples of Each Criterion
1	27.5	Environmental performance	Project will measurably reduce pollutant discharges and/or improve receiving water quality
4.5	4.5	Low to moderate costs for construction or implementation	Project implementation costs to ratepayers in terms of cost per gallon for treatment or cost per pound of pollutant removed is low to moderate
5.75	6.5	Low to moderate costs for maintenance	Maintenance cost to ratepayers, per gallon or per pound of pollutant removed, is low to moderate
6.25	6.5	Low to moderate costs for operation	Operation cost to ratepayers, per gallon or per pound of pollutant removed, is low to moderate
6.5	7.5	Quality of life enhancements	Project fits into greenway, park, recreation, ecosystem restoration, transportation, other plans
6.75	1	Availability of assistance	Grants, loans or other programs are available to cover some capital costs, land acquisition, etc.
6.75	3.5	Flooding mitigation	Project eliminates or reduces flooding in residential, commercial or other areas
7.25	0.5	Positive economic and employment impact	Project creates positive economic impact and local jobs during construction and operation
8	3.5	Low-profile operation	Project has a low visual profile and low/no odors, noise or other operational nuisances
9	10	Operational stability and resilience	Project can handle diverse flows and pollutant loads, and has a low failure risk and high reliability
9.5	10	Sustainability support	Project meets overall sustainability goals: energy use, materials, environmental footprint, etc.
11.5	7.5	Resilience	Project can withstand extreme weather events/changes over the long term
11.5	3.5	Partnerships in project implementation	Outside parties are willing to cost-share or otherwise help with construction, operation, maintenance, etc.
12.5	5.5	Positive visibility and community relations	Project enhances OCDWEP's image and relationships within the community
13.25	2.5	Lack of disruptions during construction	No or few traffic disruptions, dust, noise or other impacts during the project construction period

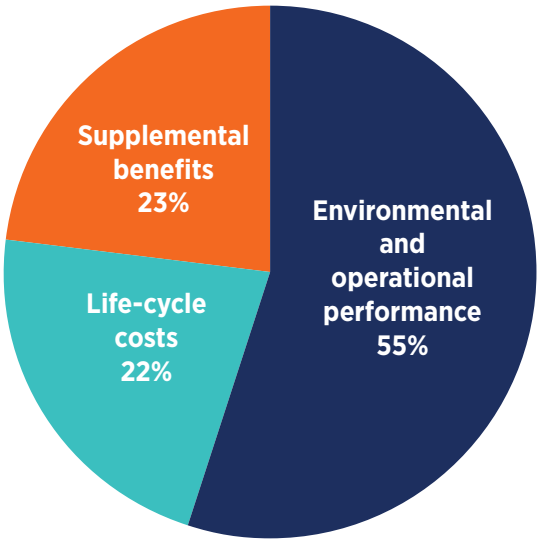


Figure 3. Public- and private-sector stakeholder weighting for criteria, from the Onondaga County workshop.

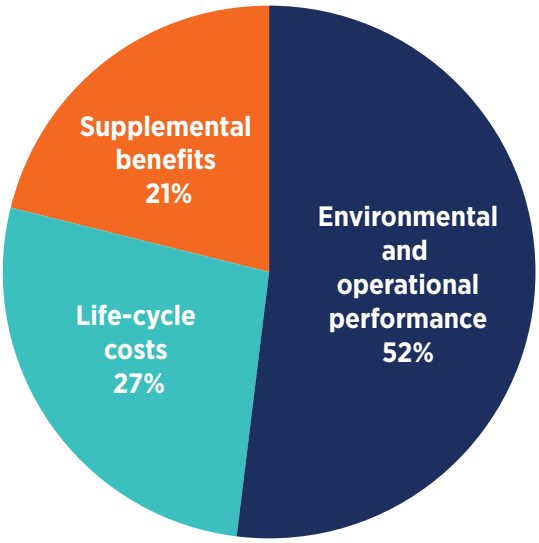


Figure 4. Informal local, state and federal agency stakeholder weighting for criteria.

shows the results. The public agency group focused on environmental performance, assigning it about half of the total weighting valuation; life cycle costs were weighted at 27 percent and supplemental benefits at 21 percent.

5.2.5 Applying Criteria

An Excel spreadsheet was produced to facilitate the county's process and provide a useful tool for scoring groups of projects. The criteria were grouped according to the broad categories of environmental performance, life cycle costs and supplemental benefits. The spreadsheet includes an editable column where evaluators from each of the groups can assign weights to each criterion. Each criterion can be individually scored (from 1 to 10) and weighted, allowing the user to evaluate and compare multiple projects using a common tool. Figure 5 shows the columns for the assigned criteria scores, the criteria weight assignments, and the total scores.

The format for the scoring matrix, shown in Figure 6, was based on two similar evaluation tools developed for OCDWEP's asset management program. EPA technical support chose to develop a project evaluation tool that capitalized on the familiarity and consistency of these existing approaches.

Figure 5. Excerpt from Excel-based spreadsheet used by Onondaga County to rank weighted criteria and score alternatives.

After assigning weighted values for each critieron (i.e., % value), enter a 1 to 10 score for each critierion below (green boxes). Total project calculated scores will appear in the orange box.

Key	1 to 10 Evaluated Score	Assigned Weighted Value	Calculated Score

Evaluation Criteria	Poor = 1	Low = 4	Moderate = 7	High = 10	1 to 10 Score	% Weight	Final Score
Environmental Performance							
Pollutant Removal	Negligible effect on pollutant removal / water quality	Some pollutant removal, difficult to quantify	Moderate but measurable pollutant removal expected	High, measurable removals for targeted pollutants expected			
Reliability	Process/technology is unstable, failure-prone	Process/technology somewhat stable	Stable/reliable under normal conditions	Able to handle diverse flows and pollutant loads; stable and reliable			
Extreme Weather	High likelihood of failure in extreme weather	Somewhat likely to fail during extreme weather	Mostly stable during all but severest storms	Able to withstand strong storms with heavy rain, winds, flooding			
Sustainability	Sustainability poor or unknown; high energy use	Some minor sustainability features (materials, energy)	Nearly meets many sustainability goals	Meets goals for energy use, materials, environmental impacts			
Integration	Poor fit with greenway, parks, recreation, transportation, other plans	Fits in with a few greenway, parks, recreation, and transportation projects	Consistent with several parts of parks, recreation, transportation plans	Excellent fit with current/ future greenway, parks, recreation, transportation, other plans			
Life-Cycle Costs							
Construction Costs	Construction/ implementation costs are very high relative to anticipated project benefits	Construction costs are moderately high vs. anticipated project benefits	Construction costs are moderately low vs. anticipated project benefits	Construction/ implementation costs are low relative to benefits (i.e., excellent cost/benefit ratio)			

Figure 5 continued to next page

Evaluation Criteria	Poor = 1	Low = 4	Moderate = 7	High = 10	1 to 10 Score	% Weight	Final Score
Operating Costs	Operating costs are very high relative to benefits	Operating costs are moderately high vs. benefits	Operating costs are moderately low vs. benefits	Operating costs are low relative to anticipated project benefits			
Maintenance Costs	Maintenance costs/ needs are high relative to benefits	Maintenance costs are moderately high vs. benefits	Maintenance costs are moderately low vs. benefits	Maintenance costs/ needs are low relative to anticipated benefits			
Funding/ Assistance	No external funding assistance or implementation partners are available	Grants, loans, or partner contributions can cover 1-20% of project costs	Grants, loans, or partner contributions can cover 21-49% of project costs	Grants, loans, or partner contributions can cover > 50% of project costs			
Supplemental Benefits							
Flood Mitigation	Project has no impact on flooding, or worsens flooding	Minor benefits regarding flood prevention/ mitigation	Moderate benefits for flood prevention/ mitigation	Significantly reduces localized flooding in target area(s)			
Acceptability	Project likely obtrusive; noise, odor complaints are likely during operation	Moderate expectations for noise, odor, and other complaints during operation	Some/few complaints are expected from project operations	Low-profile; low/no odors, noise, other nuisances expected during project operation			
Economic Impact	No jobs or other economic impact expected	A few jobs and a small economic impact expected	Moderate level of jobs and economic impact expected	Creates local jobs, enhances local economy/ business climate			
Implementation	Significant dust, traffic/ other disruptions during construction/ implementation	Moderate level of dust, traffic, and other disruptions expected at construction	Low level of dust, traffic, and other disruptions expected at construction	No/few dust, traffic/ other disruptions during project construction/ implementation			
Relationships	No community relations, good will, or other benefits expected from project	Some minor good will and relationship benefits expected from project	Moderate level of good will and relationship benefits anticipated from project	Project expected to enhance image of utility and/or project sponsors; project expected to build good will			
Final Score							

Figure 6. Consequence of failure by level of service category..

Consequence Category	Negligible = 1	Low = 4	Moderate = 7	Severe = 10
System Reliability (60%)				
Capacity	Adequate hydraulic and/or treatment capacity for all existing flows	Loss of hydraulic and / or treatment >0 <10% of existing capacity	Loss of hydraulic and / or treatment >10 <30% of existing capacity	Loss of hydraulic and/or treatment >30% existing capacity
SSO / Dry Weather CSO	No SSOs or Dry weather CSOs	SSO or DWCSO <2,000 gallons per event	SSO or DWCSO >2,000 < 100,000 per event	SSO or DWCSO >100,000 gallons per event
Property Damage	No property damage	<5 property damage claims	<25 property damage claims	<25 property damage claims
Odor	No odor complaints	<5 odor complaints	<25 odor complaints	Widespread odor complaints
Process/System Impact	No loss of treatment or system effectiveness	No loss of treatment or system effectiveness but need to use redundant systems	Will result in loss of treatment or system effectiveness if action is not taken promptly Use of redundant system required, facility not staffed 24/7	Will immediately result in significant loss of treatment or system effectiveness if action is not taken promptly
Regulatory Compliance (5%)				
Permit Limits	No permit violations	Violation with no formal enforcement action (single permit violation, SSO, or DWCSO with no long-term operational issues)	Potential for formal enforcement action with potential fines (violation of permit, SSO, or DWCSO, > 2days, < 7 days)	Potential for major enforcement action or Consent Decree impact (including fines, permit violation, SSO, DWCSO > 7 days)
Consent Decree	Meet all Consent Decree requirements (e.g., ACJ green & gray)	Restore all impaired receiving waters to target classifications not on set schedule	Impaired receiving water bodies not improving	Adverse impact on Consent Decree
Water Body Use Attainability	Restore all impaired receiving waters to target classifications on set schedule			Receiving water bodies degradation
Public & Employee Health & Safety (10%)				
Injuries	No potential injuries or adverse health effects	Potential minor injury with no loss of time; 1 of the following: confined space entry, 480V circuit, >20ft. in height	Potential minor injury with lost time; 2 or more of the following: confined space entry, 480V circuit, >20ft. in height; acidic/caustic chemicals	Potential major injury due to extreme unsafe condition; >480V; loss of ventilation in classified areas

Figure 6 continued to next page

Consequence Category	Negligible = 1	Low = 4	Moderate = 7	Severe = 10
Impact to Public Health	No infectious disease, no release of sewage, chemical, fuel, or contamination	No infectious disease. Release of chemicals or contaminates within area / volume.	Remote possibility of infectious disease. Release of chemical or contaminates in excess of containment volume.	Possible infectious disease or release of chemicals or contaminates without any containment and draining into water body or storm sewer
Fiscal Impacts (20%)				
Capital & O&M Budgets (User rate stability)	Sufficient financial resources to meet capital and O&M budget (<$5,000)	Needs to go to WEP Fiscal Officer (> $5,000 and < approximately $35,000)	Cost > $35,000 and < $100,000	Needs to go to full County Ledge (> 100K)
Public Confidence (5%)				
Construction Impact (e.g., traffic, noise)	No adverse impact on community	Managed traffic disruption	Total closure to lower density areas or local streets	Total closure or significant traffic disruption (e.g., congested area, major arterial, major connectors)
Business Impact	No adverse impact on businesses	Limited adverse impact on businesses. Impacts < 5 businesses, not resulting in temporary closure	Localized adverse impact on businesses. Impacts > 5 businesses with potential for temporary close of less than 1 day	Disruption to customers providing critical services. Impacts >10 businesses with temporary closure lasting longer than 1 day
Natural Resource	No impact on natural resources or recreation			Discharge of contaminate to an impaired water body, tributary, or hydraulic connected storm sewer with impacts to local recreation
Public Perception	No adverse media attention	Loss of some support from the public; some concerns expressed publicly (local 1-day story)	Loss of support from the public; concerns expressed publicly (multiple local news stories)	Widespread adverse impact on multiple businesses (national news story)
Development Impact	Support smart growth			No public confidence in the utility (consistent negative media)

Last modified: March 27, 2015

5.3 Santa Maria, California

5.3.1 Introduction and Background

Located in California's central coast region, the city of Santa Maria has a population a little above 100,000. The Santa Maria River flows along the northern edge of the city, and its watershed is one of the largest coastal basins in California. The Santa Maria groundwater basin is a valuable source of drinking water for the city and the surrounding area.

The soil properties and existing drainage system in Santa Maria are important considerations for stormwater management planning. The soils within the city generally have high infiltration rates, providing viable opportunities for infiltration-based water quality improvement projects. The existing drainage system contains many large and small detention and retention facilities.

The city operates a separate sanitary sewer system and the associated WWTP. Treated wastewater from the plant is disposed of through ponds that percolate wastewater into the groundwater basin without a discharge to surface waters. California regulates the effluent from the plant through Waste Discharge Requirements issued under California's Porter-Cologne Water Quality Control Act.

Stormwater discharges from the city are regulated by a NPDES general permit for a small MS4. The general permit requires that Santa Maria take steps to address the TMDL for bacteria, nutrients, pesticides and toxicity in the Santa Maria River.

City Hall, Santa Maria, California. *City of Santa Maria*

5.3.2 Identifying Stormwater and Wastewater Issues

Agriculture and livestock operations in the lands surrounding the city are significant contributors to water quality impairments of the Santa Maria River through both surface water and groundwater pathways. Other pollutant sources include onsite treatment systems, urban runoff, oil production and natural background.

The city's stormwater drainage system includes a series of constructed flood-control channels and basins. The city is challenged in meeting its own water supply protection needs in terms of both quantity and quality. Its priorities include recharging groundwater supply and protecting groundwater from contamination.

The city of Santa Maria held several public meetings to explain the purpose of integrated stormwater and wastewater planning, discuss the stormwater and wastewater issues in the city, and solicit public input on primary goals for an integrated planning effort. The city organized a project team that included city staff and their consultants, representatives from state agencies, and other stakeholders. The project team identified three overarching goals that reflected the purpose of the city's integrated plan, shown in Figure 7.

Guided by these goals, the project team developed more specific objectives (Figure 8). The challenge was to write objectives general enough to address the wide array of water quality and quantity concerns, yet specific enough to propose measurable outcomes.

Mouth of the Santa Maria River. *City of Santa Maria*

Goal 1

The first goal described what the city wishes to accomplish in terms of water quality and quantity. This goal includes language on the regulatory requirements and what the city wishes to achieve.

Protect and improve water quality and/or quantity in the Santa Maria River watershed and the Santa Maria Groundwater Basin upstream, downstream, and within the city. Achieve regulatory requirements and sustainability. Regulatory requirements include, but are not limited to, the municipal stormwater permit which addresses TMDL wasteload allocations and monitoring activities.

Goal 2

The second goal expressed how the city is seeking cost-effective actions by considering both the feasibility and flexibility of management options.

Apply the city's resources cost-effectively towards feasible and flexible actions that achieve the greatest improvement in water quality and quantity.

Goal 3

The third goal reflected stakeholder input during the public meetings. Stakeholders expressed interest in projects that would beautify the city.

Promote beautification of the city through actions and programs that improve quality of life and provide other economic and social benefits.

Figure 7. Overarching goals in the city of Santa Maria's integrated plan.

City of Santa Maria Integrated Plan Objectives

1. Maximize infiltration and minimize runoff and pollutant loading to water resources through best management practices (BMPs); ensure these features continue to function according to design.
2. Reduce stormwater runoff and increase the aesthetic value and livability of the community through low impact development (LID) projects associated with new development and redevelopment projects.
3. Detect and eliminate illicit discharges.
4. Engage public in pollution prevention and water quality issues.
5. Promote implementation of BMPs that maximize community benefits and beautification.
6. Safely promote groundwater recharge through treatment and percolation/infiltration techniques.
7. Provide enhanced nutrient removal through projects.
8. Work collaboratively with agriculture to protect the health of the groundwater basin.
9. Work closely with the Regional Board, neighboring cities and counties, local agencies and organizations, and agriculture to identify collaborative opportunities. Possible stakeholder groups could include, but are not limited to, the Integrated Resources Water Management Group, the Twitchell Management Authority, and irrigated agriculture industry groups and associations.
10. Seek opportunities to creatively manage water resources, increasing water quantity and preserving water quality.

Figure 8. Santa Maria's integrated plan objectives.

Artificial channels in Santa Maria.

Aerial view of the Santa Maria WWTP.

5.3.3 Identifying Potential Projects

At this point, the city drew on its experience in stormwater management and developed a list of potential projects to evaluate, including a wide range of green infrastructure projects. The city operates a variety of nonstructural stormwater management strategies as well (e.g., street sweeping, educational outreach, storm drain markers). Many of the projects on the list had been under consideration from other planning efforts; other projects were added based on stakeholder input. The city's final list of potential projects to be evaluated in the integrated plan is shown in the text box to the right.

5.3.4 Developing and Selecting Criteria

After identifying issues and potential projects, the city of Santa Maria identified metrics to measure how well a project would address its goals. The city defined a metric as a qualitative or quantitative measurement of a project's performance or other characteristic relevant to achieving the goals—for example, how many regulations are addressed by a particular action, or the quantity of pollutant load reduced. Metrics were developed so that they could help identify the projects that would best achieve the community's goals.

Green infrastructure options for Santa Maria. *Clockwise from upper left: grass and paver stone driveway, dry gravel drainage, infiltration basin used as soccer field, pervious parking*

Potential Projects: City of Santa Maria, California

1. Infiltration basin improvements
2. New water infiltration basins
3. Water quality treatment—public LID
4. Promoting LID on private property
5. Dry weather flow diversion to sanitary sewer
6. Initial peak stormwater flow diversion to sanitary sewer
7. Urban flow from Main Street subwatershed to WWTP
8. Expansion of secondary water system for landscape irrigation
9. Biofilter at WWTP
10. WWTP process enhancements for nitrogen removal
11. Water quality filters at Black Road
12. Sanitary sewer collection system evaluation
13. Agriculture tailwater treatment through WWTP
14. Nutrient trading
15. Residential dry weather runoff
16. Treat and release BMPs
17. Channel or basin improvements
18. Trash capture
19. Salt removal at city blending and disinfection facility
20. Acquisition of more Table A state water
21. Residential salinity reduction alternative

The project team developed an initial list of metrics that incorporated water quality and quantity regulatory requirements to make sure pollutants of concern and other regulatory requirements were within the decision-making framework. Scoring each action (from 1 to 10) provided a way to compare benefits across all metrics. After the team reached consensus on the subjective scoring approach, the city developed scoring criteria for each metric that best reflected achievement of the city's goals.

The project team recognized that if a decision-making process uses too many metrics, it can be difficult to interpret or document the methods and results. For example, some heavy metals are often delivered to waterbodies through sediment loading. Using two metrics, one for reducing sediment and one for reducing sediment-bound heavy metals, would give double weight to a similar benefit. A simpler yet still effective approach is to choose one of these metrics to represent both.

5.3.5 Applying Criteria

A scoring matrix tool was created: a spreadsheet that allowed users to choose and weight criteria and score projects (see "Overview of Santa Maria's Spreadsheet Tool").

The tool was reviewed by the project team and revised, then tested in a work session with stakeholders. Attendees included representatives from the city, California's Central Coast Regional Water Quality Control Board, the city's consultants, and public works officials from neighboring cities and counties. The work session was designed to promote conversation between city staff and stakeholders and to encourage participants to think more deeply about the priorities.

The stakeholder work session was integral to the development of the decision-making spreadsheet tool. Several lessons learned emerged from the work session experience:

- Testing the spreadsheet tool early helped the workgroup understand the interaction of weights, metrics, and scoring criteria, and identified needed changes.
- Holding the testing session in person enabled the workgroup to effectively navigate the integrated planning tool together and implement changes and enhancements that maximize its usefulness.
- A successful strategy was to have a subset of stakeholders with expert knowledge of the projects choose the initial scores and explain their reasoning to the larger group. This helped keep assumptions consistent across the projects.
- Choosing a diverse set of projects proved useful for initial testing and refinement of the tool.
- Testing the tool enabled stakeholders to agree on using pollutant removal efficiency (instead of pollutant loading) and project location as metrics, and incorporating weighting to prioritize certain metrics.
- The work session helped the city incorporate cost metrics based on operation and maintenance and capital costs that best fit their specific needs. During the work session, the stakeholders debated whether to score the project based on cost-effectiveness or magnitude of cost. They decided on cost magnitude so that projects with very large capital costs, which may be difficult to fund, would receive a lower priority.

The role of the decision-making framework in project selection evolved throughout its development. Ultimately, the city decided that the framework and tool would be used to screen projects, and those selected as "promising" would be further evaluated using more quantitative pollutant removal, hydrologic, cost and other analyses.

Overview of Santa Maria's Spreadsheet Tool

Info	Contains instructions for using the tool.
Metrics	The user chooses criteria for each project using drop-down menus.
Scoring	Reports individual and composite scoring results.
Scoring by goals	Reports scoring aggregated by goals as well as composite scoring results.
Project drop-downs	Text used in drop-down menus. The user can adjust this text.
Scores and weighing	Levels of scores and weighting are set.
Extra metrics	Instructions for adding metrics to the tool.

The spreadsheet has seven tabs that guide the user through the process. The first step in using the tool is to enter the names of the projects to be evaluated in the "Metrics" tab. Once the project names are entered and initial weighting adjustments made, the user begins to choose scores using the drop-down menus under each metric. The user can then view the results in the "Scoring" and "Scoring by Goals" tabs. The "Scoring" tab shows the weighted scores for all three goals by metric and the composite score for all metrics across the three goals.

In the city's process, metrics that are given higher weights have more influence over the composite score. For example, if the nutrients metric is given more weight than the bacteria metric, then a project that provides 50 percent nutrient reduction will score higher than a project that provides 50 percent bacteria reduction (with all other scores equal between the two projects). A weighted average is used so that the composite score is normalized to the 1 to 10 point scale. The tool allows for different visual comparisons among projects in the "Scoring" and "Scoring by Goals" tabs. Unless the drop-down menu text or weights are adjusted, using the tool is straightforward and does not require experience with Excel. The desired scores are chosen in the "Metrics" tab, and the results are reviewed in the "Scoring" and "Scoring by Goals" tabs (Figures 9 and 10).

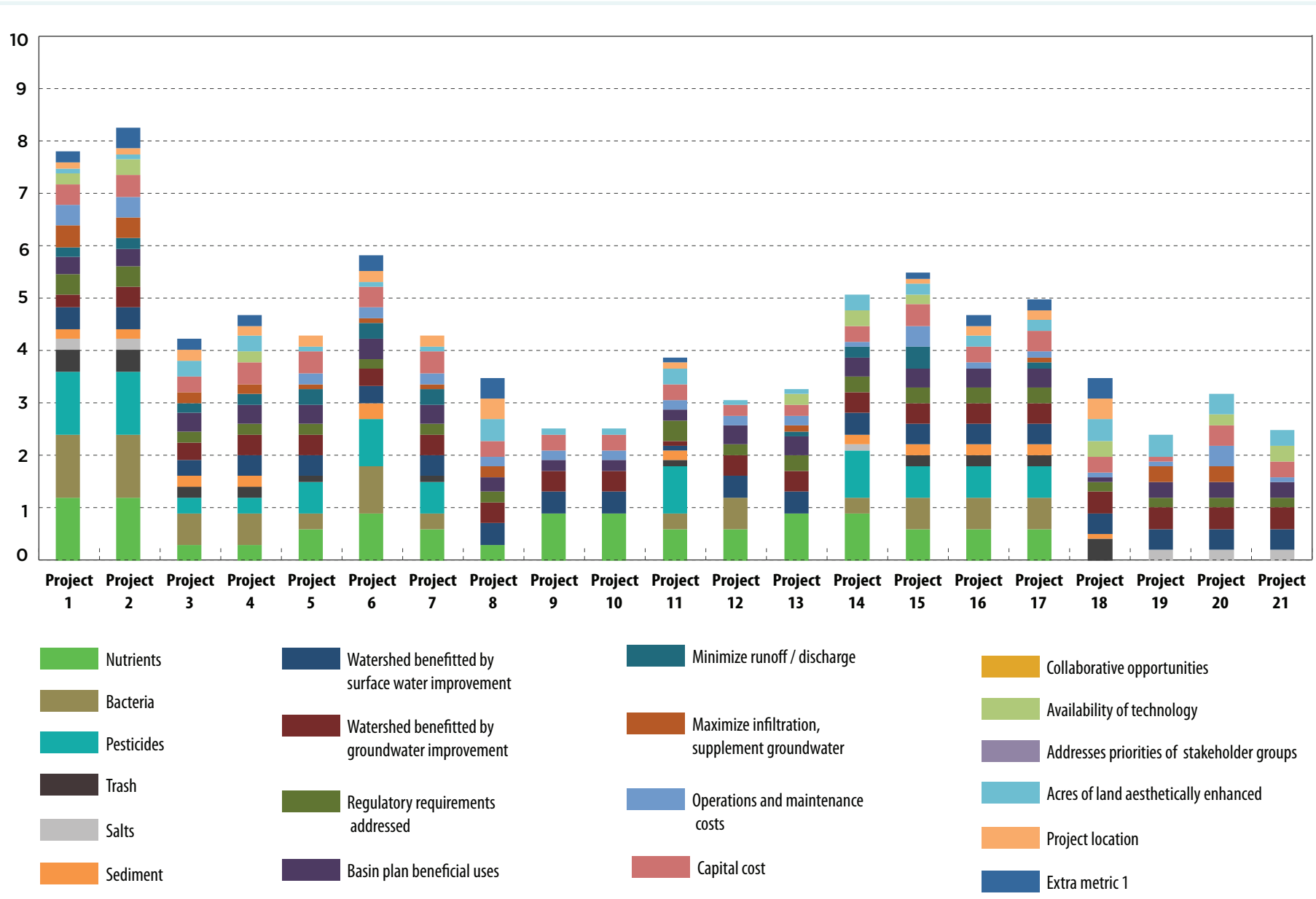


Figure 9. Composite score stacked chart in the "Scoring" tab.

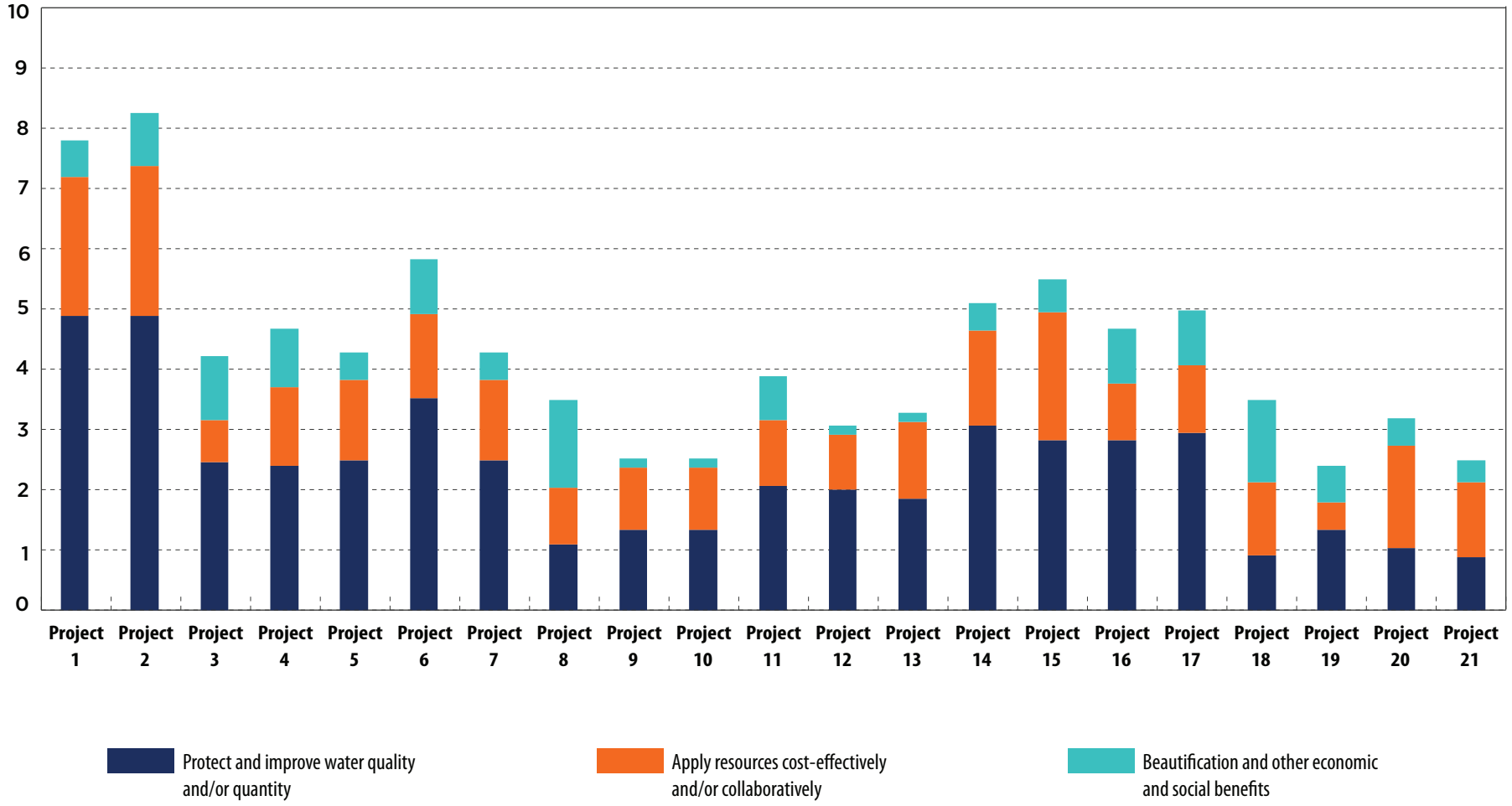


Figure 10. Composite score stacked chart in the "Scoring by Goals" tab.