



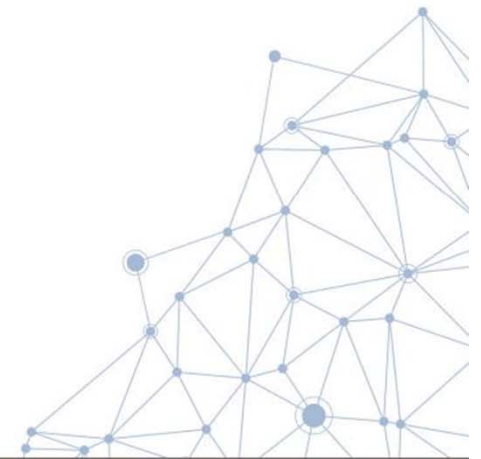
Is Your Stormwater Management Program Working?

Evaluating Your MS4 Program

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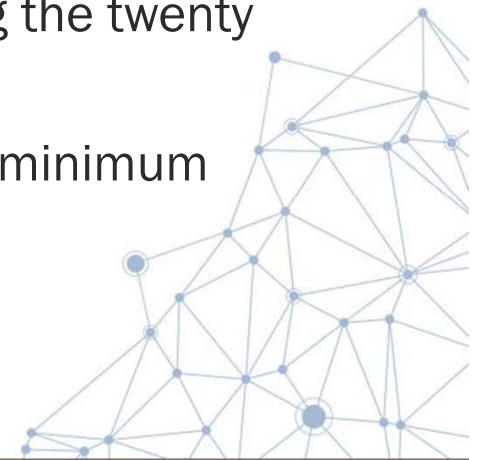
Presentation Overview

- MS4 permit evaluation requirements
- EPA MS4 evaluations/audits
- California Stormwater Effectiveness Assessment Guide
- Example of an effectiveness strategy



Maryland Phase II MS4 permit (Dec. 2016 Tentative Permit)

- Part IV – Evaluation, Assessment and Reporting
- “permittee must evaluate progress toward achieving compliance with all permit requirements, and the appropriateness of implemented BMPs”
- MS4 Progress Report (Appendix D, 19 pages) required each year:
 - “report to MDE that evaluates progress toward meeting the twenty percent impervious area restoration requirement”
 - Also asks questions to track implementation of the six minimum control measures.

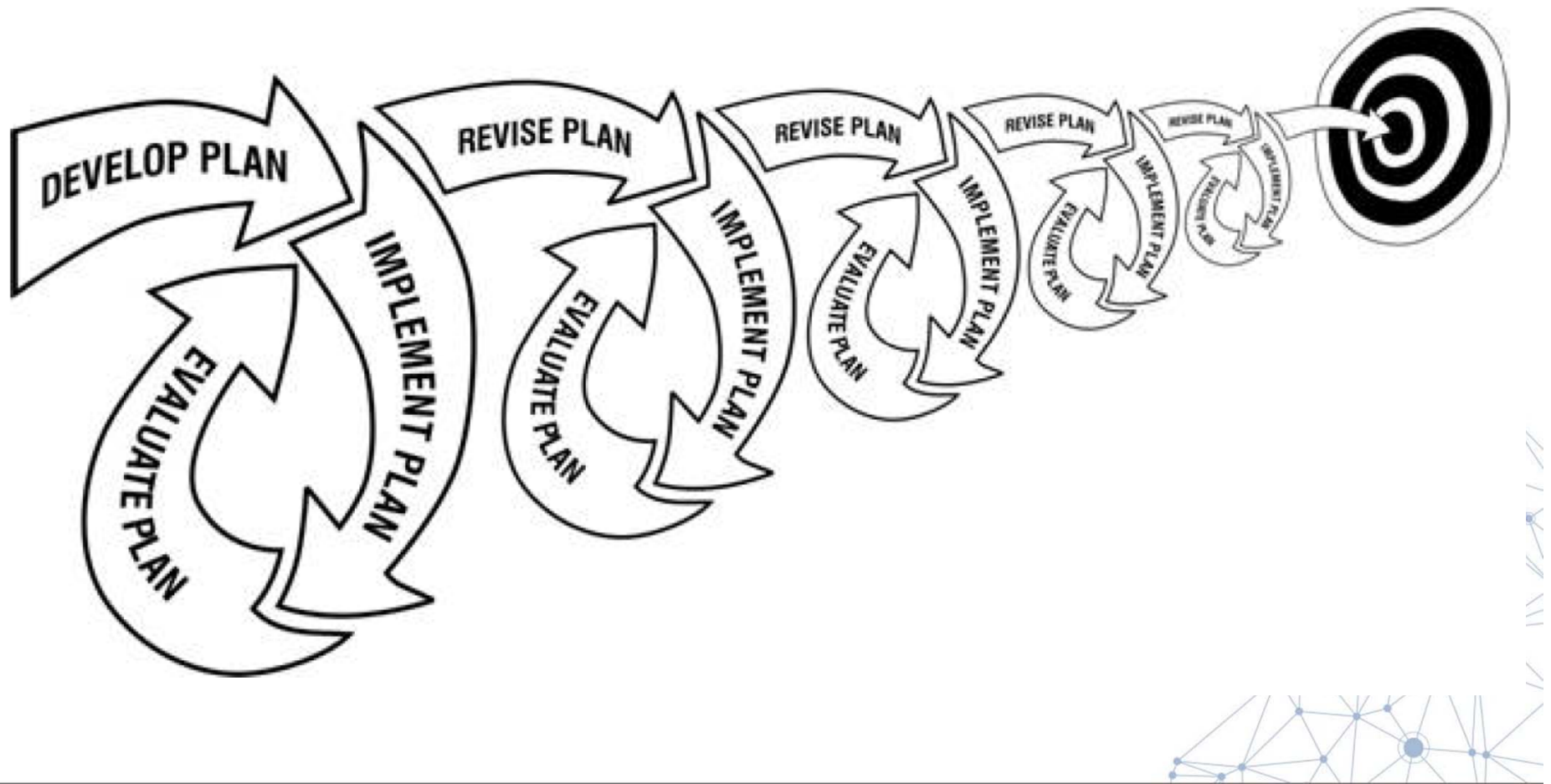


Maryland Phase I MS4 permits

- **Required to submit an annual report database that includes:**
 - storm drain systems, urban best management practices,
 - impervious surfaces, watershed restoration,
 - monitoring site locations, chemical monitoring, pollutant load reductions, biological monitoring,
 - illicit discharge detection, erosion and sediment control responsible personnel training, quarterly grading permit summaries, and fiscal analyses
- **Also required to conduct detailed watershed assessments that includes current WQ conditions, WQ problems, prioritize projects and pollutant load reduction benchmarks**



Stormwater Management is an Iterative Process



MS4 Evaluations/Audits

- Conducted by EPA or the State
- Focused on assessing compliance with MS4 permit requirements
- Paperwork violations
- Field/implementation violations

MS4 Program Evaluation Guidance

U.S. Environmental Protection Agency Office of
Wastewater Management

Comments on this guide should be directed to:

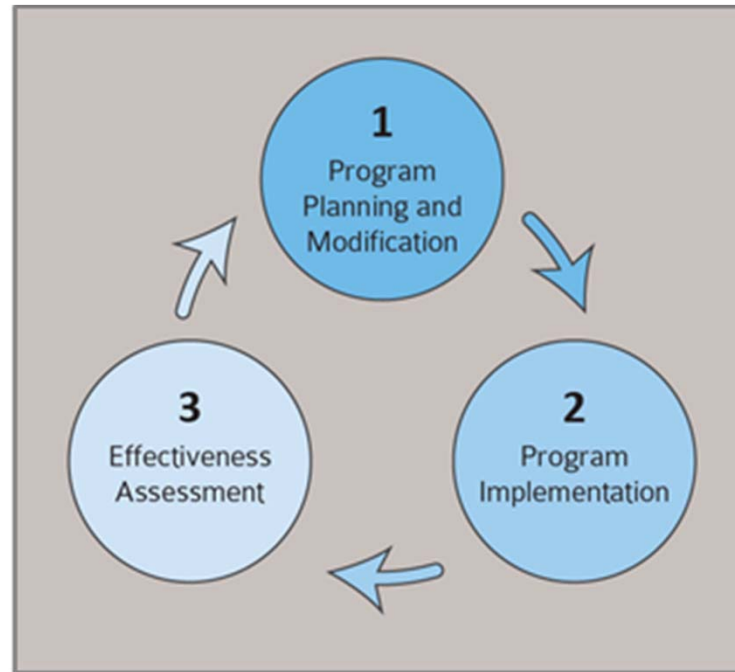
Jenny Molloy
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January 2007 — *Field test version*

EPA-833-R-07-003



MS4s facing increasing pressure to demonstrate effectiveness

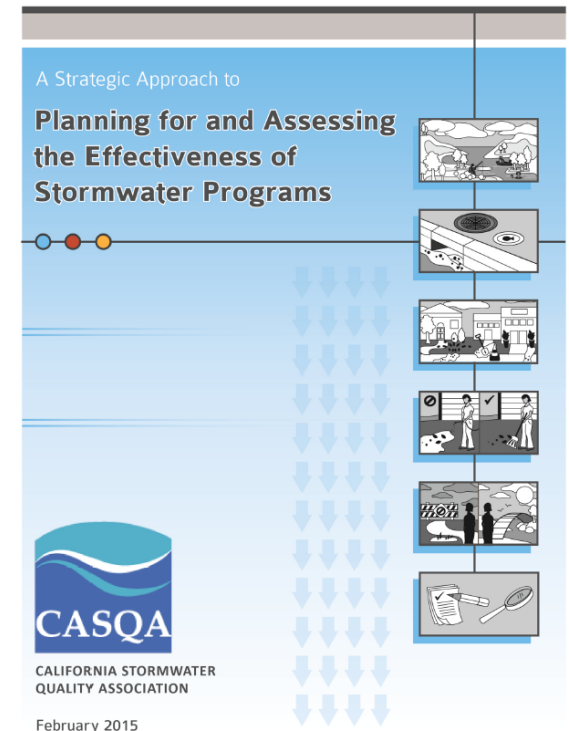


- Effectiveness is an integral part of a comprehensive stormwater planning process

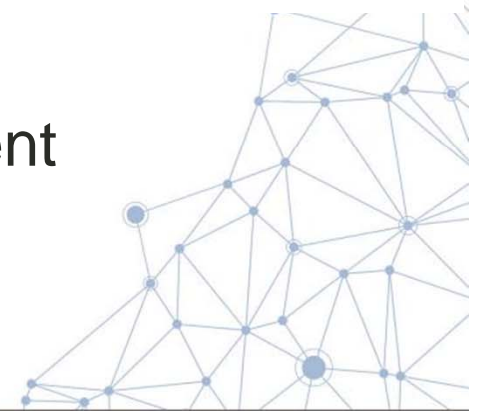


California Stormwater Effectiveness Assessment

- Developed by the California Stormwater Quality Association (CASQA)
- Defines “effectiveness assessment” as:
 - The methods and activities that managers use to evaluate how well their programs are working and to identify modifications necessary to improve results

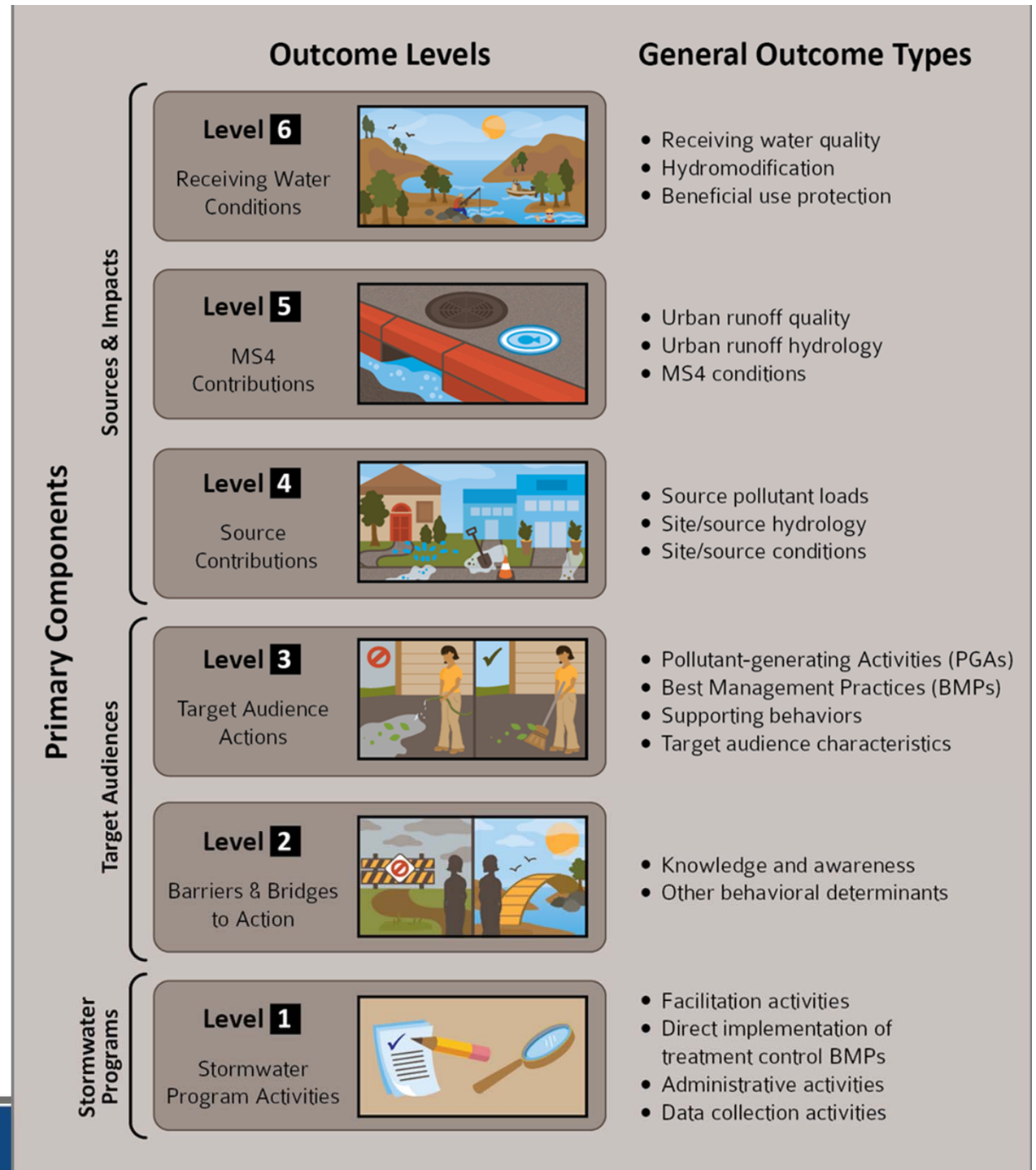


https://www.casqa.org/effectiveness_assessment



Six Outcome Levels

- Measurable endpoints associated with programs, people, and physical systems
- Outcomes are interrelated



Sources and Impacts

Sources & Impacts

Outcome Levels

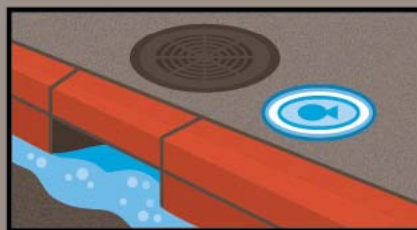
Level 6

Receiving Water
Conditions



Level 5

MS4
Contributions



Level 4

Source
Contributions



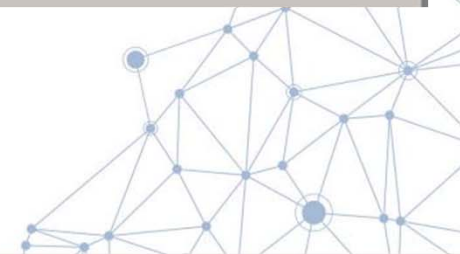
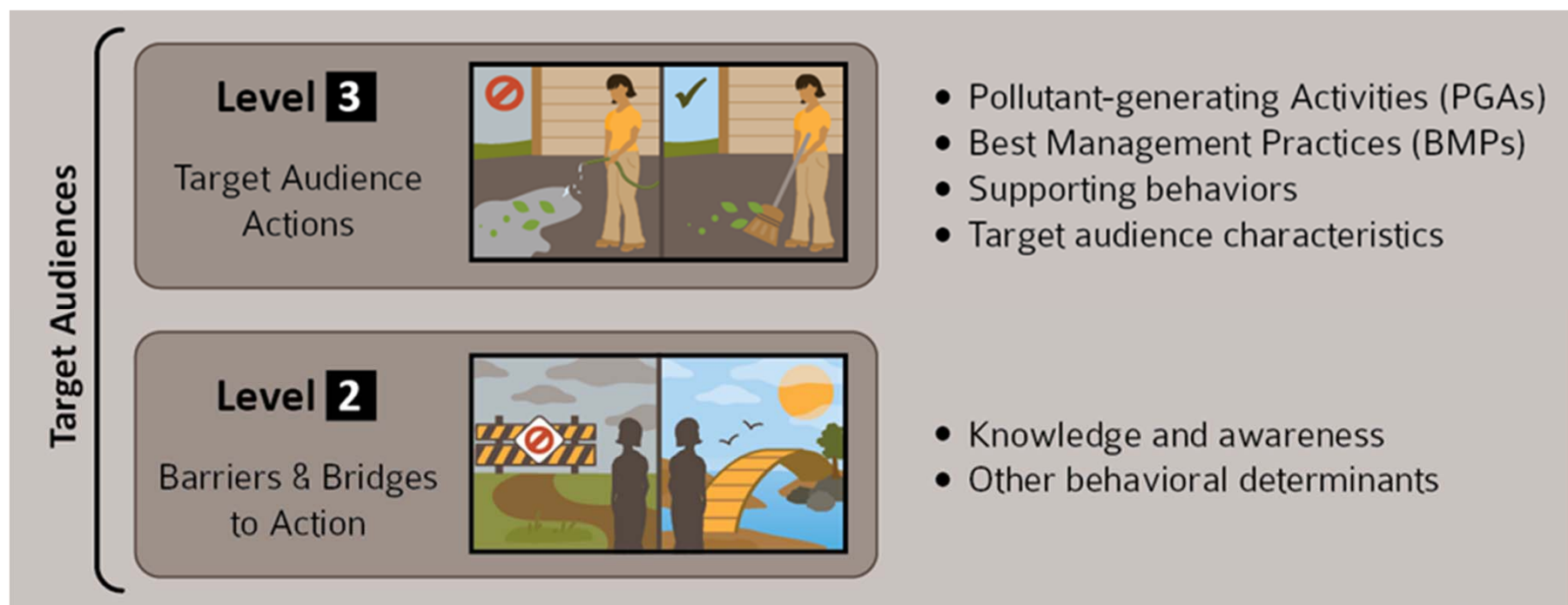
General Outcome Types

- Receiving water quality
- Hydromodification
- Beneficial use protection

- Urban runoff quality
- Urban runoff hydrology
- MS4 conditions

- Source pollutant loads
- Site/source hydrology
- Site/source conditions

Target Audiences



Stormwater Management Programs

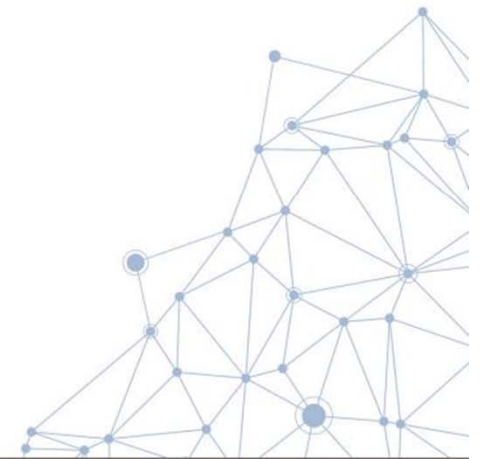
Stormwater
Programs

Level 1

Stormwater
Program Activities

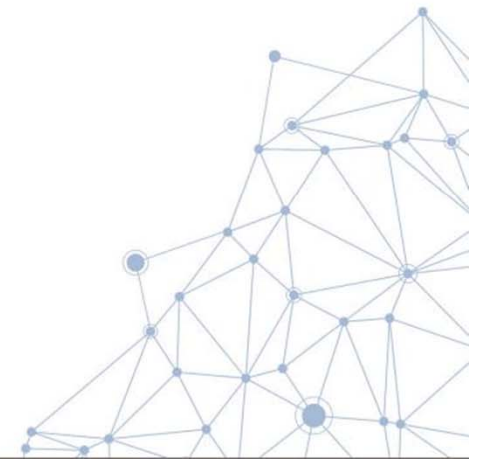


- Facilitation activities
- Direct implementation of treatment control BMPs
- Administrative activities
- Data collection activities



Stormwater Strategic Plan

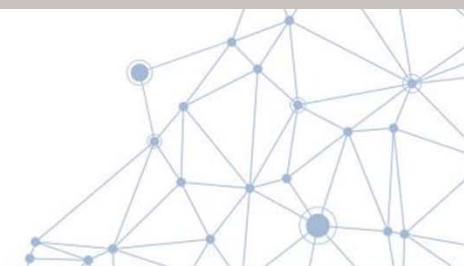
- Also called a Program Effectiveness Assessment and Improvement Plan (PEAIP) for Phase II MS4s
- Developed in Three Stages:
 - Planning Preparation (Stage 1)
 - Strategic Planning (Stage 2)
 - Addressed in next slide
 - Strategic Plan Completion (Stage 3)



Core Steps in a Structured Planning Process



- Steps applied to each of the outcome levels



Step A: Characterizing Problems

1. Evaluate existing conditions

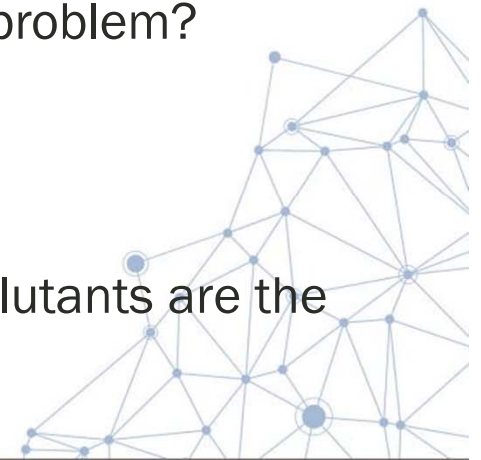
- What are priority receiving waters?
- How are conditions changing over time?
- Which MS4 facilities flow to priority receiving waters?

2. Define problem conditions

- What are priority problems for each priority receiving water?
- Is condition linked to a known higher outcome level problem?

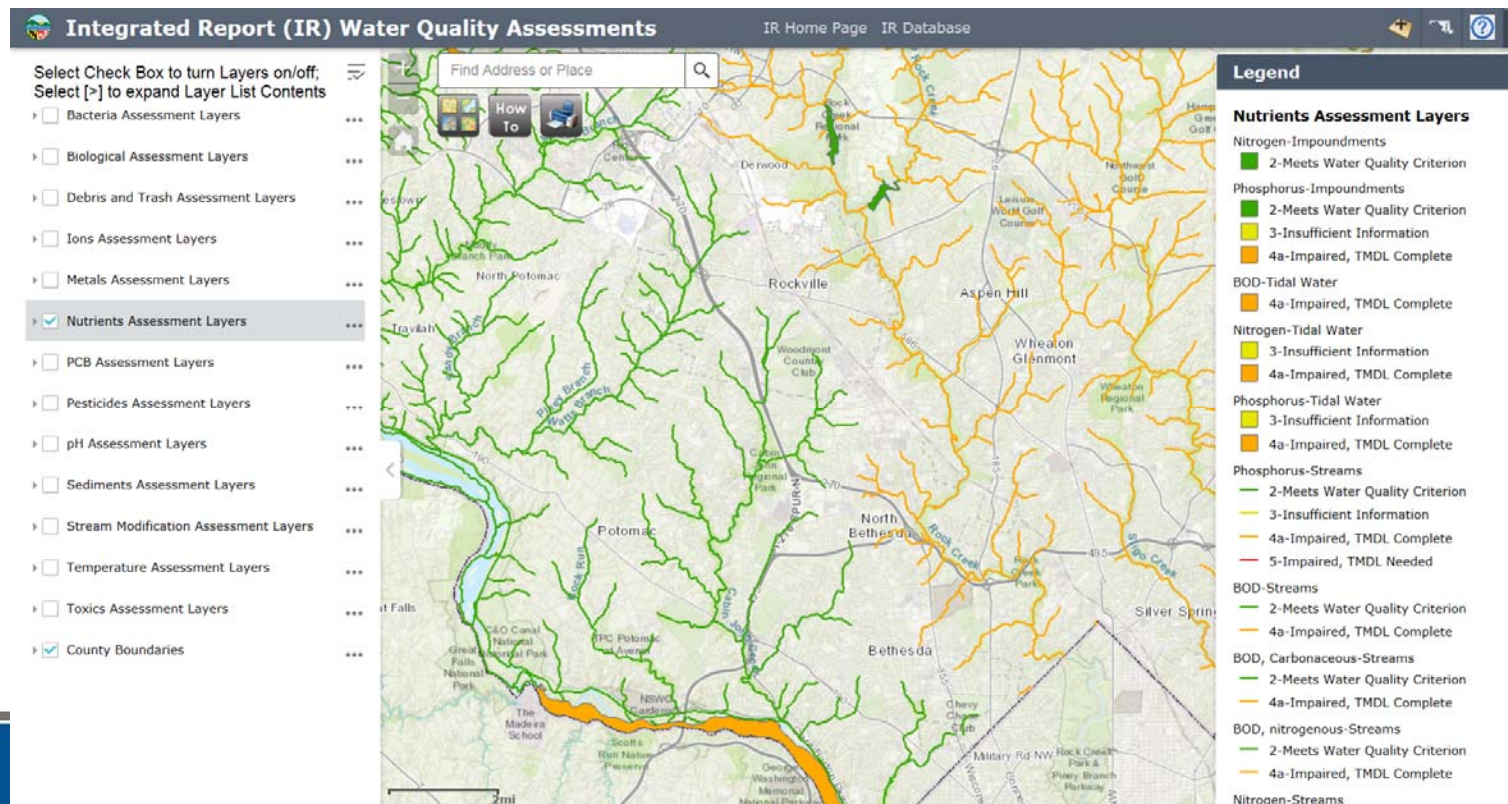
3. Prioritize problem conditions

- Is priority influenced by regulatory requirements?
- Which portions of drainage areas that contribute pollutants are the highest priority?



Example Tool

- Maryland Integrated Report Water Quality Map
- <http://www.mde.maryland.gov/programs/water/TMDL/Integrated303dReports/Pages/ImpairmentMaps.aspx>
- View pollutant layers for all watersheds in the State



Step B: Targeting Outcomes

1. Identify end-state targets

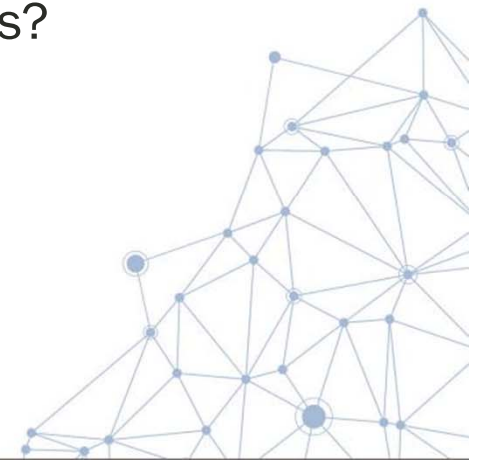
- What changes will be targeted for the receiving water?
- Who is target audience responsible for each source contribution?
- What behavioral changes will be targeted?

2. Establish interim targets

- When and how will targeted changes be measured?
- What interim targets are needed to evaluate progress?

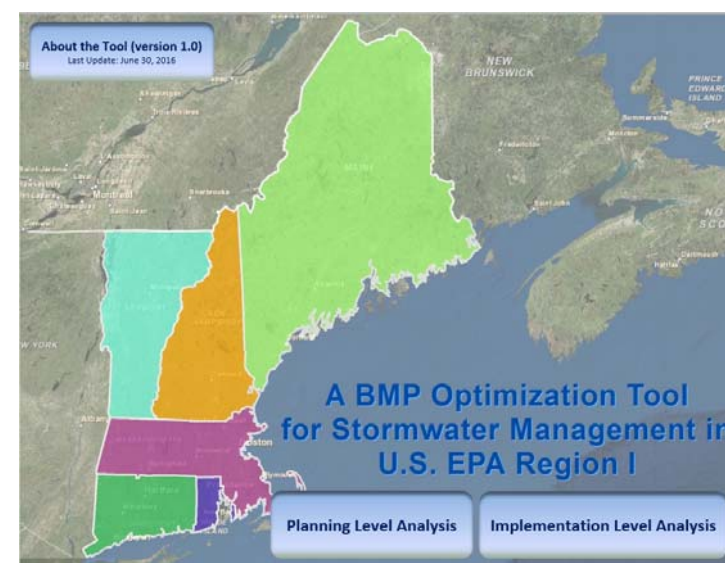
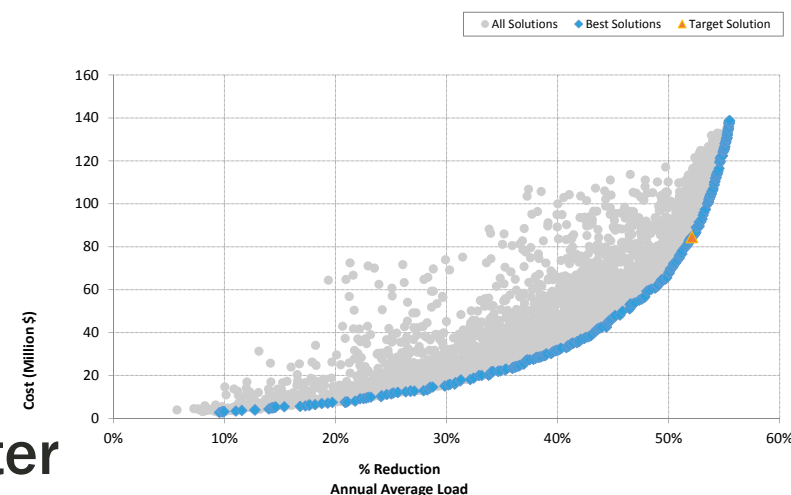
3. Identify data requirements

- What metrics will be used?



Example Tool: EPA Region 1 Opti-Tool

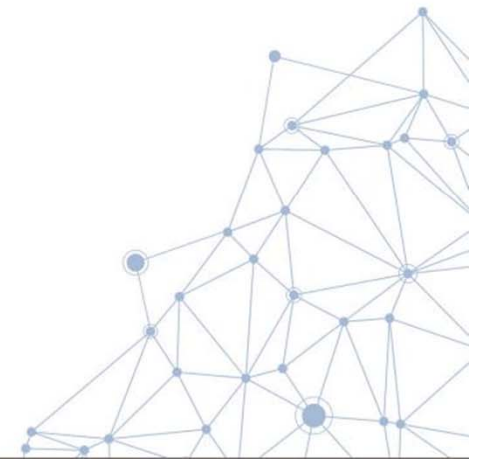
- Facilitates stormwater engineers in developing Nutrient Management Plans for permit compliance
- Supports planning level analysis to identify the cost-effective stormwater controls that meet the load reduction requirements in permit
- Evaluates and estimates credits for the stormwater controls for tracking the progress toward interim goals
- Flexible to adopt for other regions



Step C: Documenting Knowledge and Data Gaps

1. Compiling Step A Knowledge and Data Gaps
2. Compiling Step B Knowledge and Data Gaps
3. Consolidating the Knowledge and Data Gaps list

Stormwater Strategic Plan templates (called PEAIIP's) are available on CASQA's website.



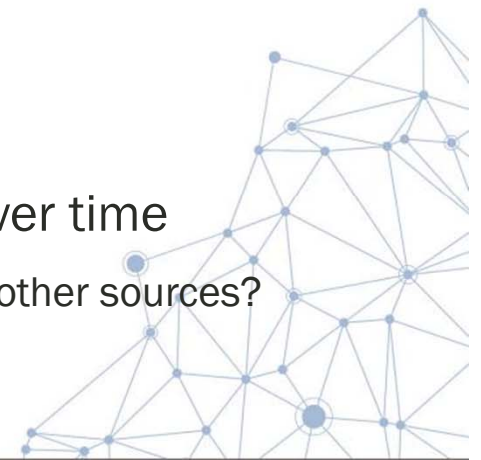
Hypothetical case study

• Receiving water conditions (Level 6)

- Evaluate and prioritize receiving water problems
 - Are waters impaired by sediment, and are they meeting TMDL targets for sediment?
 - 303(d) listed impairments - nutrients/sediment
- Identify receiving water targets
 - TMDL targets - % reduction
- Document data requirements

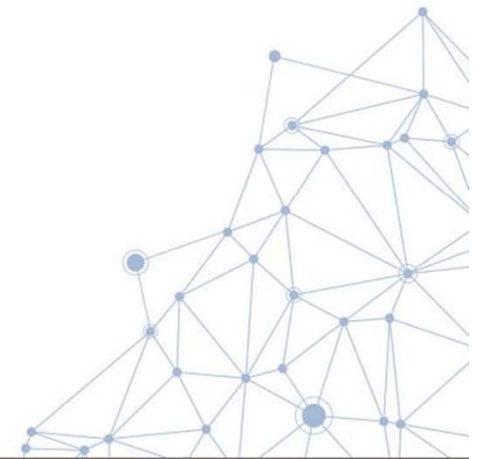
• MS4 Conditions (Level 5)

- Evaluate MS4 conditions and how they are changing over time
 - Is urban stormwater a significant source of sediment? Are there other sources?
 - Source: urban runoff



Hypothetical case study

- **Source Contributions (Level 4)**
- **Sediment sources from urban stormwater include:**
 - Construction site erosion
 - Road maintenance
 - Commercial/industrial activities
 - Storage yards
 - Parking lots
 - Road/lot maintenance



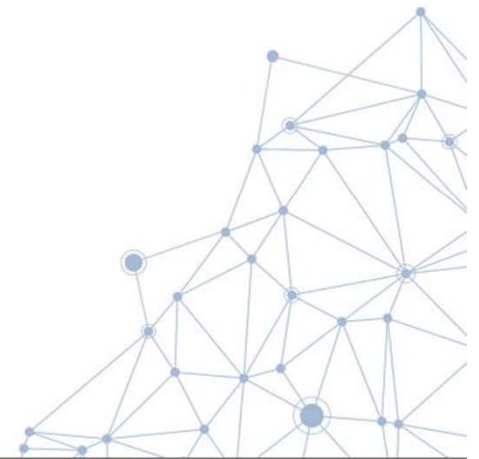
Hypothetical case study

- **Target Audience Actions (Level 3)**

- Construction site owners/operators
- Contractors
- Commercial/industrial entities
- Municipal staff

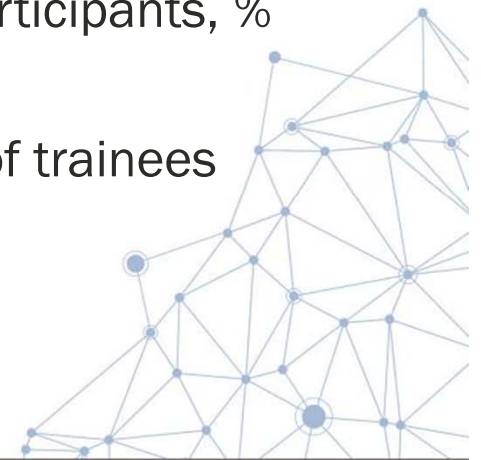
- **Barriers and Bridges to Actions (Level 2)**

- Inspections
- Training
- Monitoring
- Surveys



Hypothetical case study

- **Stormwater Program Activities (Level 1)**
- **Focus on management questions, data assessment methods, and data collection methods**
- **For example, for Education/Outreach (Level 2):**
 - Are construction site operators informed and trained on BMPs effective at controlling sediment?
 - Data assessment methods: # of trainings held, # of participants, % change in survey results
 - Data collection methods: Track trainings and number of trainees



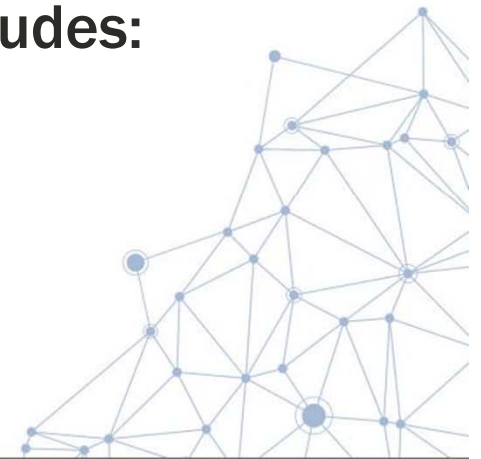
Hypothetical case study

- **Stormwater Program Activities (Level 1)**
- **Another example, for Target Audience Actions (Level 3):**
 - Are construction sites being managed so they are in compliance with local ordinances and preventing sediment from leaving the site?
 - Data assessment methods: total # of sites, # inspections conducted, # and % of sites adequately implementing BMPs, # and % of sites that require follow-up inspection, # of illicit discharges involving sediment from construction sites
 - Data collection methods: Track inspection results from all sites inspected, including follow-up inspections, track illicit discharge source investigation results



Additional Resources

- **Feb. 2015 Strategic Approach to Planning for and Assessing the Effectiveness of Stormwater Programs:**
 - Appendix B – includes 4 “Sources and Activities Profile Sheets” (e.g., construction, industrial, municipal operations and planning/land development)
 - Appendix C – includes 6 “Pollutant Profile Sheets” (e.g., bacteria, mercury, nutrients, pesticides, sediment, and trash)
- **CASQA program effectiveness website also includes:**



Questions?

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https://www.casqa.org/effectiveness_assessment

