

Water Environmental Services

Sanitary and Stormwater Rules and Standards Workshop #1

July 17 | 2018



Today's Plan

- Meeting Purpose and Goals
- Regulatory Analysis
- Policy and Technical Questions
 - Thresholds and Exemptions
 - Flow Control Strategy
 - Definitions
 - LID/Green Infrastructure Approach
- Plan Forward
 - Summary of Decisions
 - Follow-up Assignments

Meeting Purpose and Goals

Today's Focus

Project Goals/Objectives

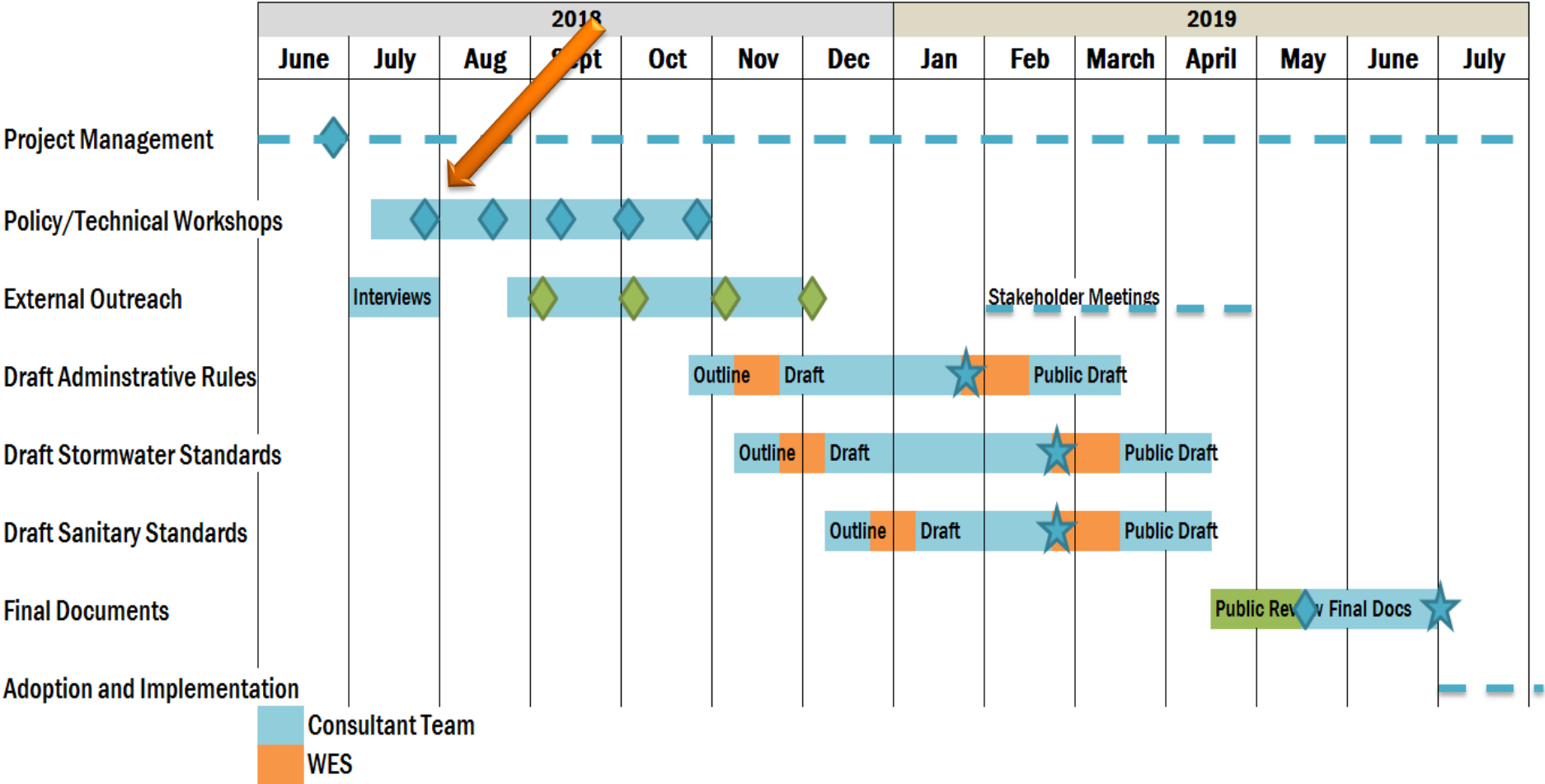
Develop consistent, comprehensive sanitary and stormwater rules and standards for TCSD, CCSD, and SWMACC

- Consistent standards across districts
- Cover more projects under “normal” conditions
- Simplify the review process

Engage WES Staff and external stakeholders to identify and resolve key policy issues

Develop consensus and understanding among stakeholders, and create a clear project road map

Process Overview



Workshop Plan

#1	Thresholds and Stormwater Management Strategy	#4	Sanitary Sewer Regulations and Fiscal Policies
Key Question	<i>What is the overall management approach in designing stormwater controls?</i>	Key Question	<i>What is the overall management approach for sanitary sewer? What changes need to be made to the sanitary sewer fiscal policies?</i>
Topics	<ul style="list-style-type: none"> Stormwater management thresholds Flow control standard – infiltration, peak flows, flow durations, retention Definitions – pre-development, redevelopment, retrofit Exemptions Allowable sizing tools (present options) 	Topics	<ul style="list-style-type: none"> Sanitary Connections Pretreatment Requirements SDC Calculations and Credits Shared Laterals Sanitary bonds and acceptance requirements Reimbursements
#2	Stormwater Facility Selection and Design Criteria	#5	Ownership/Maintenance and Miscellaneous Topics
Key Question	<i>What facilities will be used for stormwater management?</i>	Key Question	<i>Who will be responsible?</i>
Topics	<ul style="list-style-type: none"> Allowable sizing tools Allowable facility types Stormwater facility design requirements UICs and Infiltration Testing 	Topics	<ul style="list-style-type: none"> Any additional outstanding topics or spillover from 4 previous workshops Document Layout – division of content between Rules and Standards documents
#3	Stormwater Policies and Submittal Process	Other	Additional Discussion Items – Internal or Individual Meetings
Key Questions	<i>What credits and incentives are available? What processes will be used to review and approve stormwater design?</i>		
Topics	<ul style="list-style-type: none"> Credits or incentives for using green infrastructure strategies Downspout disconnection – requirements, criteria, credits “Fee in Lieu” program for system development charge vs. onsite facility? Site Planning Process and Development Guidelines – rural SWM Plan? Submittal, review, and approval process Downstream analysis requirements 		<ul style="list-style-type: none"> Stormwater conveyance standards Stormwater facility typical sections Stormwater Facility Design Requirements – detail items Standard details for sanitary and storm Other - TBD

**Today:
What is the overall stormwater
management approach?**

Policy and Technical Issues



Regulatory Analysis

What's required?

How do the current rules/standards compare?

Stormwater Regulations in Clackamas County

- Water quality standards have been exceeded locally in the Willamette River:
 - Bacteria
 - Mercury
 - Temperature
- TMDLs have been established for the Willamette River and its tributaries.
- Clackamas County has a Phase I NPDES Permit from DEQ to cover discharges from the stormwater systems (MS4s)
 - Permit applies to CCSD#1, portions of SWMACC, and DTD



MS4 NPDES Permit History

- Permit Application: 1991-1993
 - Development of Stormwater Management Program: SWMP
 - Monitoring implementation
- First Permit: 1995–2000
- Second Permit: 2004-2009
 - Updated SWMP and monitoring plan
- Third Permit: 2012-2017
 - Updated SWMP and monitoring plan
 - New/additional requirements
- Next Permit...???

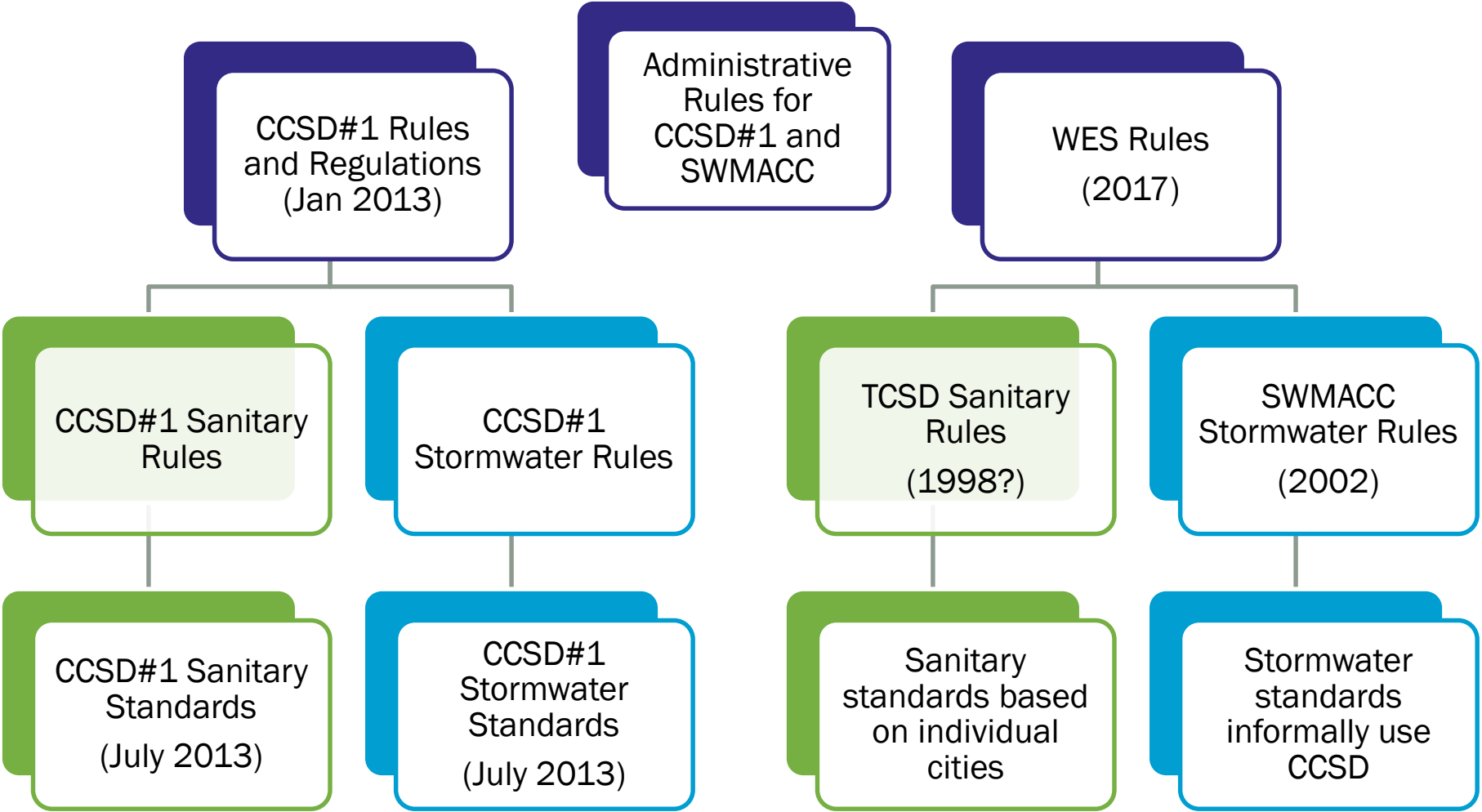


MS4 NPDES Post Construction Requirements

- Must establish standards that...
 - Target natural surface conditions
 - Reduce volume, duration, and rates of discharge
 - Prioritize Low Impact Development (LID) and Green Infrastructure (GI)
 - Capture and treat 80% of average annual runoff volume
- Stormwater program must also...
 - Remove LID barriers in municipal code
 - Include specific BMP design criteria
 - Ensure tracking and maintenance of facilities.
- *Requirements may change with next permit issuance*



Existing Standards



Regulatory Analysis Matrix

Clackamas County WES Stormwater Design Standards Comparison July 2018					
	NPDES Phase I MS4 Permit Requirements and Other Requirements	Clackamas County Service District #1 (CCSD #1) Stormwater Standards	Surface Water Management Agency of Clackamas County (SWMACC) Stormwater Standards	CCSD #1 and SWMACC Administrative Rules	Gap Analysis
Manual(s)	<ul style="list-style-type: none"> NPDES Phase I MS4 Permit Language Water Pollution Control Permit (WPCP) (issued June 27, 2013 to CCSD #1, SWMACC and Clackamas County) 	<ul style="list-style-type: none"> Clackamas County Service District No. 1 Stormwater Standards (July 1, 2013) 	<ul style="list-style-type: none"> WES Rules (June 2017): <i>Chapter 3 – Surface Water Management Rules and Regulations for Rate Zone 3: SWMACC Rules and Regulations (December 15, 2002)</i> Note: Only a small portion of the northern end of SWMACC is under an NPDES Permit. 	<ul style="list-style-type: none"> Surface Water Management Rules Administrative Rules for CCSD No. 1 and SWMACC (January 2003) 	<ul style="list-style-type: none">
Thresholds for Development	<p><u>A.4.f.i Program Requirements</u></p> <ul style="list-style-type: none"> Implement and enforce a post-construction stormwater pollutant and runoff control program for new development and redevelopment projects that create or replace 5,000 square feet (or greater) impervious surface.* <p>*Clackamas County includes jurisdictional areas within CCSD #1, SWMACC, and jurisdictional areas with post-construction program oversight by Clackamas County Department of Transportation and Development.</p>	<p>Section 5.1</p> <ul style="list-style-type: none"> Requirements apply to development results in 5,000 sf or more surface and/or modification impervious surfaces including management, natural resource erosion control requirements Requirements apply to development results in less than 5,000 sf surface and/or modification impervious surfaces are required provisions in Section 4 and are exempt from Sections 5.3, 5.4 and 5.5. 	<p>Section 5.2.4</p>	<p>Administrative Rules.</p>	<ul style="list-style-type: none"> Meets requirements.
LID Implementation	<p><u>A.4.f.i Program Requirements</u></p> <ul style="list-style-type: none"> 3) Prioritize and implement low-impact development, green infrastructure or equivalent design and construction approaches. <p><u>A.4.f.iii Stormwater Quality Management Manual must include:</u></p> <ul style="list-style-type: none"> 3) Applicable LID, GI or similar stormwater runoff reduction approaches. 4) Conditions where the implementation of LID, GI, or equivalent approaches may be impracticable. <p><u>A.4.f.ii Barriers to LID</u></p> <ul style="list-style-type: none"> Identify, and where practicable, minimize or eliminate ordinance, code and development standard barriers that inhibit design and implementation techniques intended to minimize impervious surfaces and reduce stormwater runoff (e.g. Low Impact Development, Green Infrastructure). 	<ul style="list-style-type: none"> Not specifically addressed. Allowable stormwater management facilities include several facility types (swales, filter strips, constructed wetlands) that fall into the LID/GI category. 	<ul style="list-style-type: none"> Not specifically addressed. 	<ul style="list-style-type: none"> Not addressed in the Administrative Rules. 	<ul style="list-style-type: none"> Not clearly stated that LID/GI is the priority. Consider revising language to make it clear that LID and green infrastructure are preferred approaches. Need to add site-specific limitations to the use of LID/GI. Consider adding rain gardens, stormwater planters, green streets, and other LID/GI facilities to the approved list of BMPs. Consider adding credits for site development techniques or BMPs that minimize impervious surfaces.

Regulatory Comparison
Clarity Recommendations
Implementation Recommendations

Regulatory Analysis

Comparison to NPDES Permit

- Thresholds are consistent with permit requirements.
- Need to identify LID/GI as preferred approaches.
- Add green infrastructure facilities to the approved list of BMPs (rain gardens, stormwater planters, greet streets, etc.)
- Add site limitations and prescriptive design criteria for all approved BMPs.
- Provide pathway to address volume and duration for sites where infiltration is not feasible.
- Define offsite mitigation and fee-in-lieu options
- Add credits for site development techniques or BMPs that minimize impervious surfaces.

Regulatory Analysis

Additional Recommendations

- Add clarifying language for water quality standards
 - 1” storm captures 80% of average annual runoff
 - Pollutant removal efficiency goals
- Provide current references for facility sizing methodology.
- Adjust language for proprietary treatment systems to match DOE classification system.
- Map of downstream capacity limitations may be outdated – consider update.
- Add UIC requirements.

Questions/Discussion



Thresholds and Exemptions

Threshold Questions

- What projects will be required to apply post construction stormwater management controls?
- Are there any areas where more stringent controls should be applied?
- Are there any exemptions (ex. Direct discharge without flow control for projects discharging to the Willamette River)?
- Are there any activity types that should be exempt from the definition of new impervious surface (ex. Repaving projects)?

Thresholds for Stormwater Management NPDES Permit Requirements

“...The minimum project threshold applicable to each co-permittee post-construction stormwater pollutant and runoff control program is identified in Table A-1.” (Clackamas County = 5,000 sf impervious surface area)”

(Schedule A.4.f.i)

“To reduce pollutants and mitigate the volume, duration, time of concentration and rate of stormwater runoff, the co-permittee must develop or reference an enforceable post-construction stormwater quality manual or equivalent document by November 1, 2014, that, at a minimum, includes the following:

“1) A minimum threshold for triggering the requirement for post-construction stormwater management control and the rationale for the threshold.”

(Schedule A.4.f.iii)

Note: Clackamas County includes jurisdictional areas within CCSD #1, SWMACC, and jurisdictional areas with post-construction program oversight by Clackamas County DTD.

Thresholds for Stormwater Management

Current Standards

- **CCSD #1:**
 - Requirements apply to development that results in 5,000 sf or more of new impervious surface and/or modification of existing impervious surfaces.
 - Smaller projects must still comply with portions of the stormwater standards (erosion control, buffers, etc.)
- **SWMACC:**
 - Requirements apply to residential subdivisions and partitions of parcels with the potential to create more than two lots as currently zoned and for developments having more than 5,000 sf of impervious surface.
 - Exemptions for 2- and 3-lot partitions that can't be further partitioned under current zoning.

Threshold Questions

- What projects will be required to apply post construction stormwater management controls?
- Are there any areas where more stringent controls should be applied?
- Are there any exemptions (ex. Direct discharge without flow control for projects discharging to the Willamette River)?
- Are there any activity types that should be exempt from the definition of new impervious surface (ex. Repaving projects)?

BREAK



Flow Control Strategy

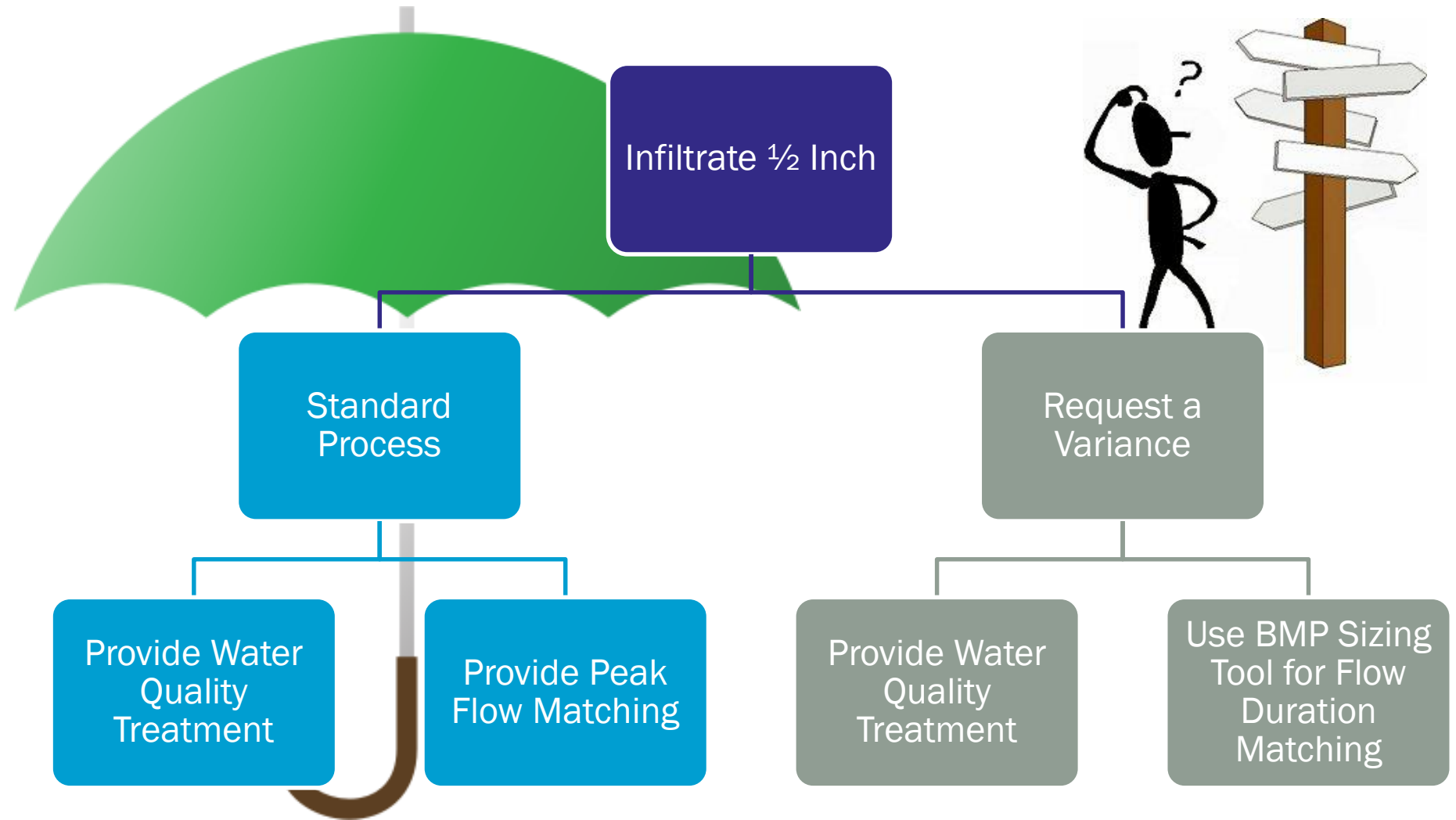
Flow Control Strategy

Current Standards

- Infiltrate all runoff from $\frac{1}{2}$ inch storm.
 - 96 hours to fully infiltrate
 - 36 hours if used with detention
- Peak flow matching (all projects):
 - 2-year, 24-hour post-developed runoff rate \rightarrow $\frac{1}{2}$ of a 2-year, 24 -hour pre-developed discharge rate
- Peak flow matching (areas of limited downstream capacity)
 - 25-year, 24-hour post-developed runoff rate \rightarrow 2-year, 24 -hour pre-developed discharge rate

Flow Control Strategy

Current Implementation



Flow Control Strategy

NPDES Permit Requirements

“2) Reduce site specific post-development stormwater runoff volume, duration ,and rates of discharges to the municipal separate stormwater system (MS4) to minimize hydrological and water quality impacts from impervious surfaces;”

“4) Capture and treat 80% of the annual average runoff volume, based on a documented local or regional rainfall frequency and intensity.”

(Schedule A.4.f.i)

“To reduce pollutants and mitigate the volume, duration, time of concentration and rate of stormwater runoff, the co-permittee must develop or reference an enforceable post-construction stormwater quality manual or equivalent document by November 1, 2014, that, at a minimum, includes the following:

“2) A defined design storm or an acceptable continuous simulation method to address the capture and treatment of 80% of the annual average runoff volume.”

(Schedule A.4.f.iii)

Flow Control Strategy Options

- Peak Flow Matching
- Flow Duration Matching
- Retention/Infiltration Standard

... or a combination

Flow Control Strategy

Technical Background Hydromodification Watershed Action Plans

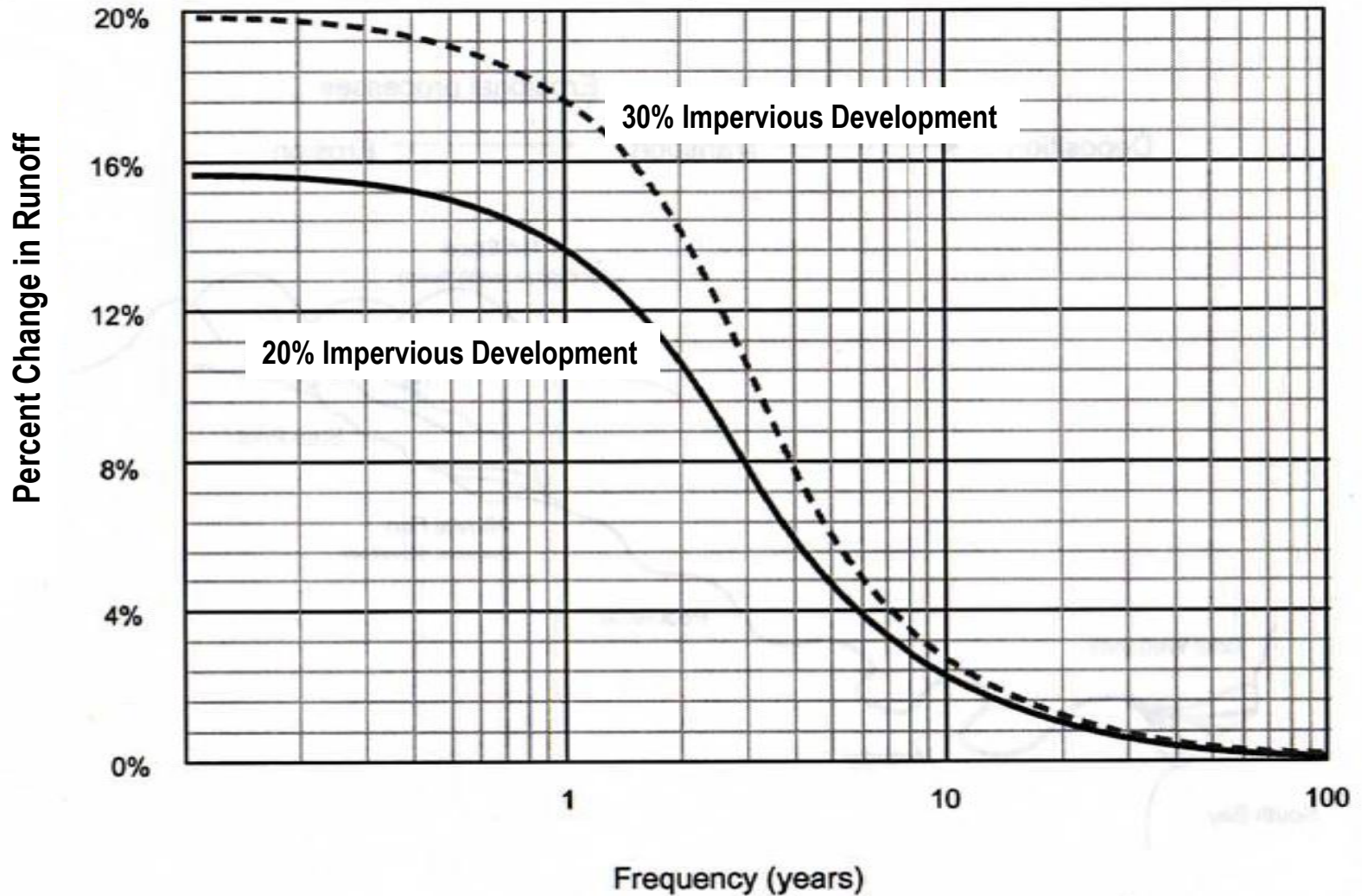
What does the science say?

Dunne and Leopold

- ***Geomorphically significant flows*** range from a lower threshold of flow where bed material begins to move to an upper limit where flood flows are no longer contained in the channel.
- The frequency and duration of ***geomorphically significant flows*** are the primary factors that control channel stability or instability.
- Frequent flow events move the most sediment over time and maintain the channel dimensions.

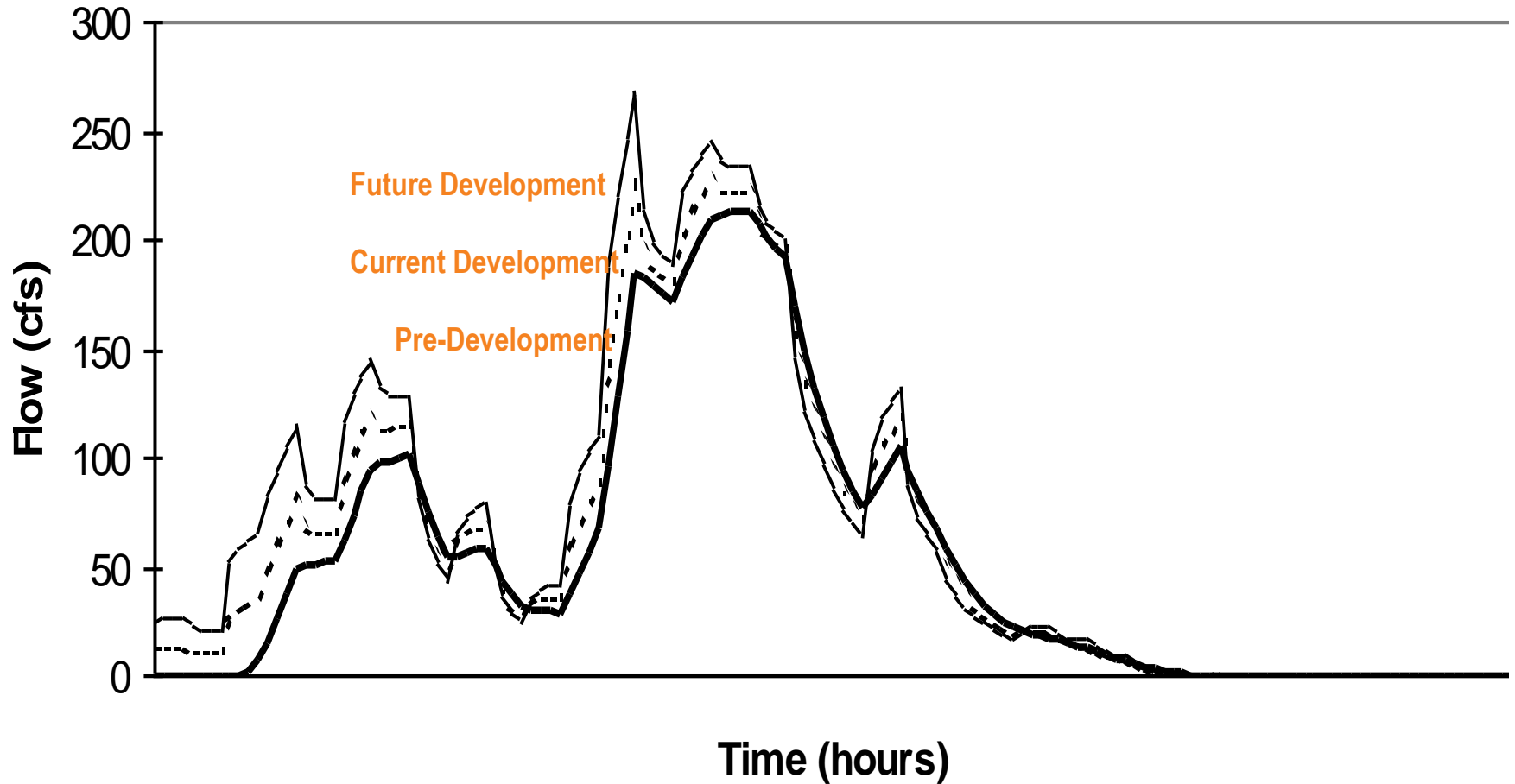


Why small storms are important



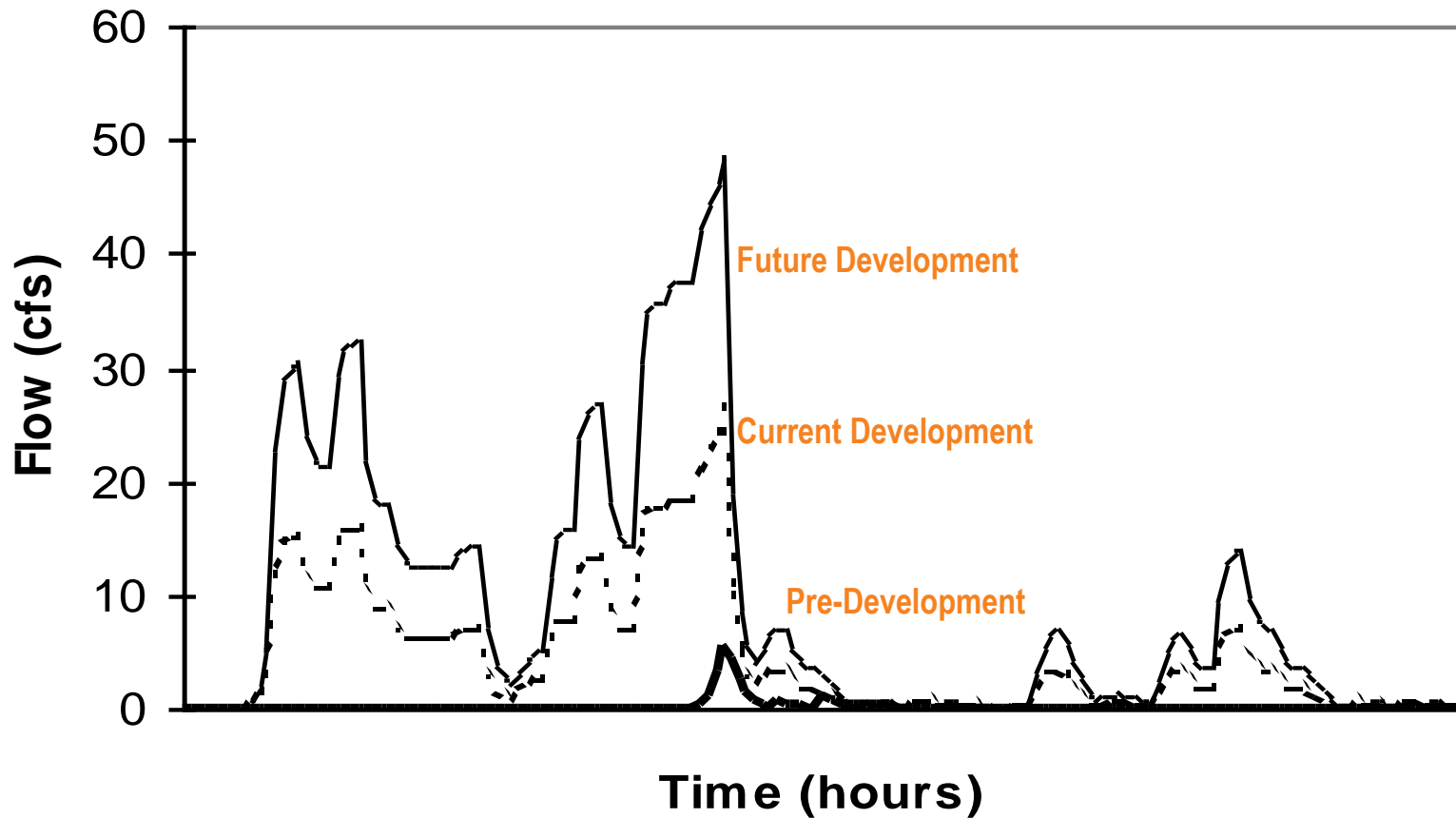
Example Hydrograph – Large Event

February 1996 Storm Simulated
Hawkins View Subbasin



Example Hydrograph – Small Event

Typical Winter Event
Hawkins View Subbasin



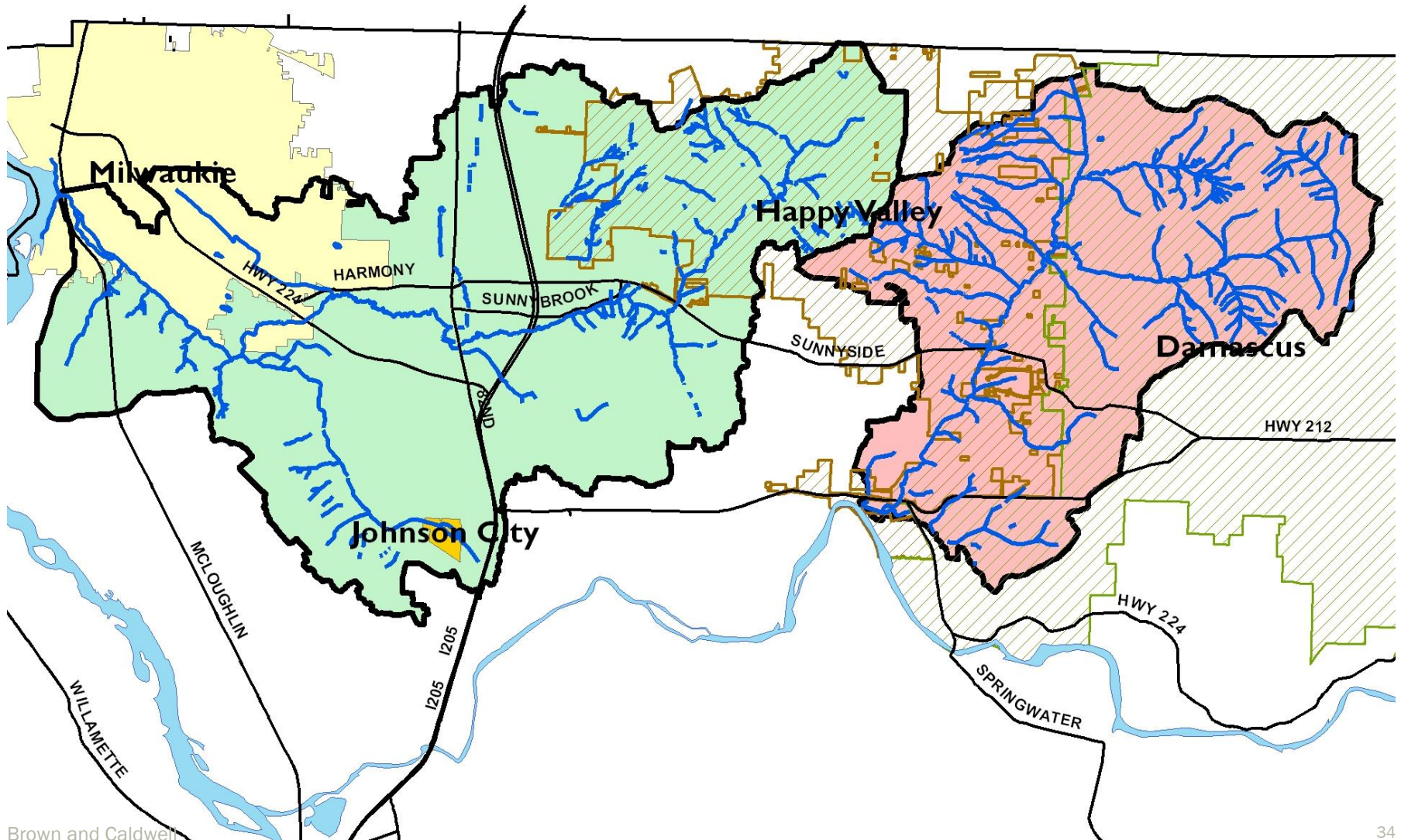
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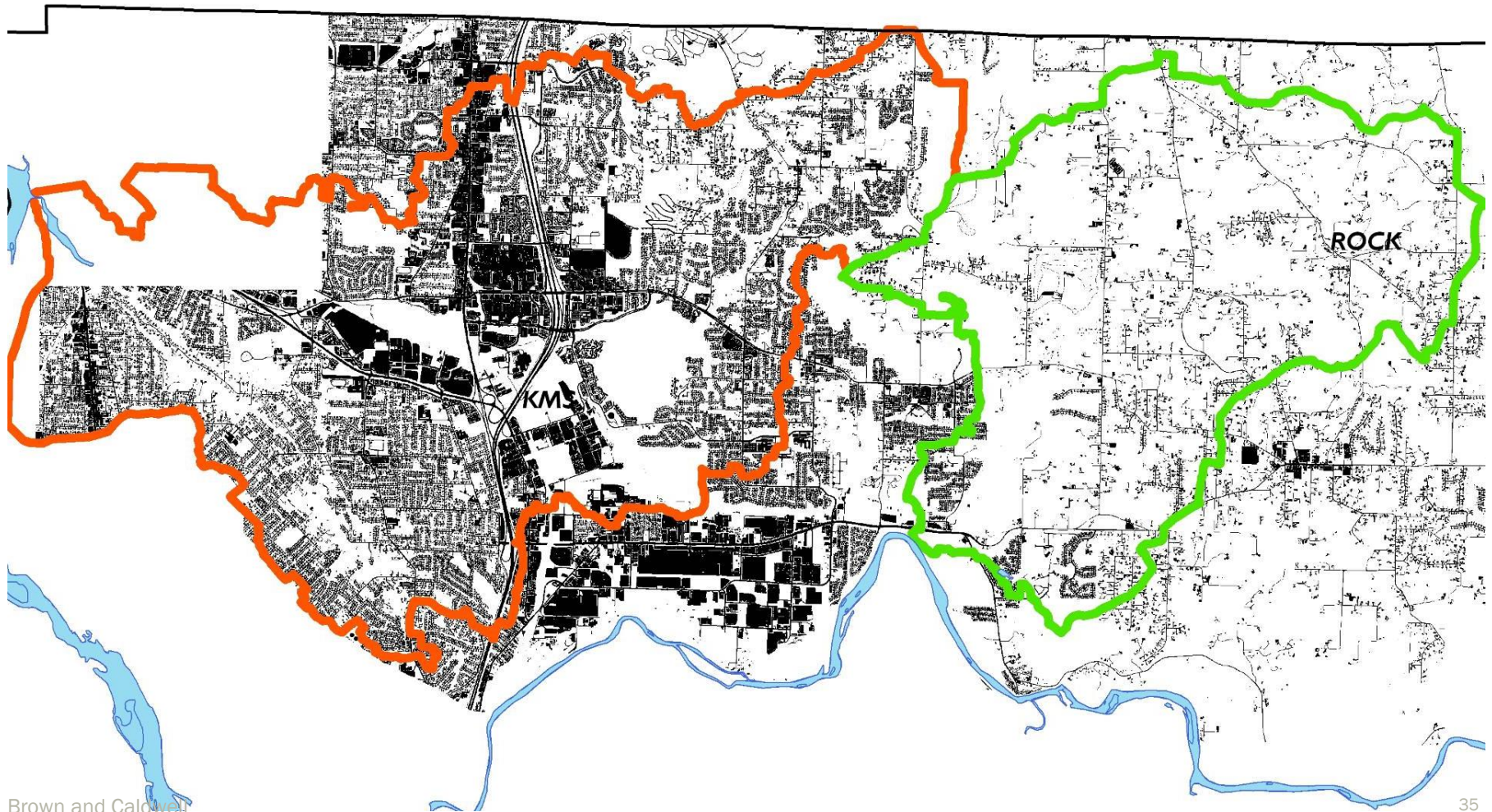
- ***Geomorphically significant flows*** range from a lower threshold of flow where bed material begins to move to an upper limit where flood flows are no longer contained in the channel.
- The frequency and duration of ***geomorphically significant flows*** are the primary factors that control channel stability or instability.
- Frequent flow events move the most sediment over time and maintain the channel dimensions.



Watershed Action Plans Study Areas



Watershed Action Plans Impervious Surface (2004)



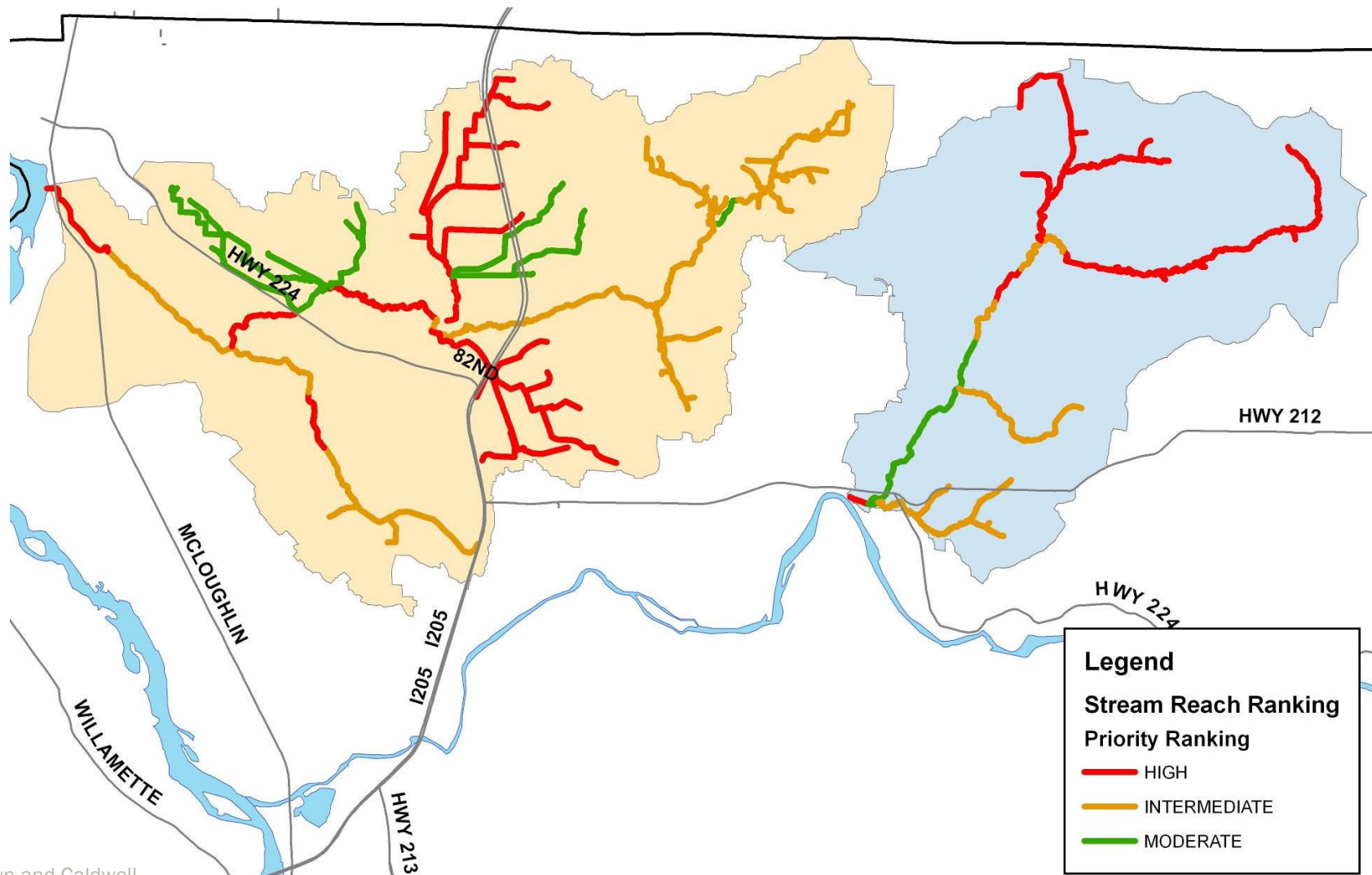
Watershed Action Plans

Key Observations

- Hydromodification
 - Low summer flow
 - Increased runoff
 - Channel instability
- Water quality degradation
 - Reduction in sensitive aquatic species
 - Increase in tolerant aquatic species
 - Reduction in quality of in-stream habitat
- Areas of Degraded Riparian Habitat
- Insufficient Riparian Cover



Watershed Action Plans Management Strategy Prioritization

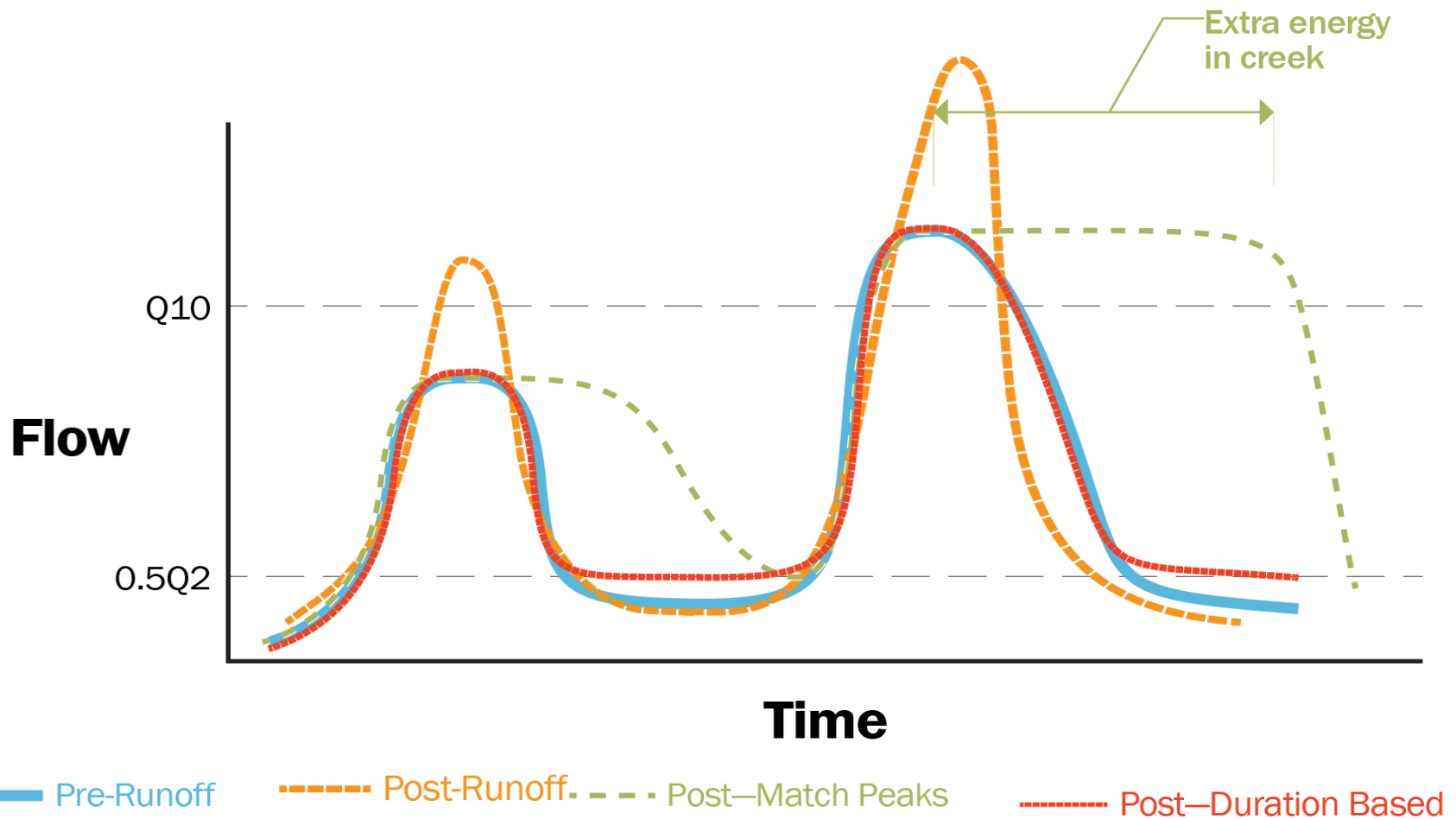


Flow Control Strategy Options

- Peak Flow Matching
- Flow Duration Matching
- Retention/Infiltration Standard

... or a combination

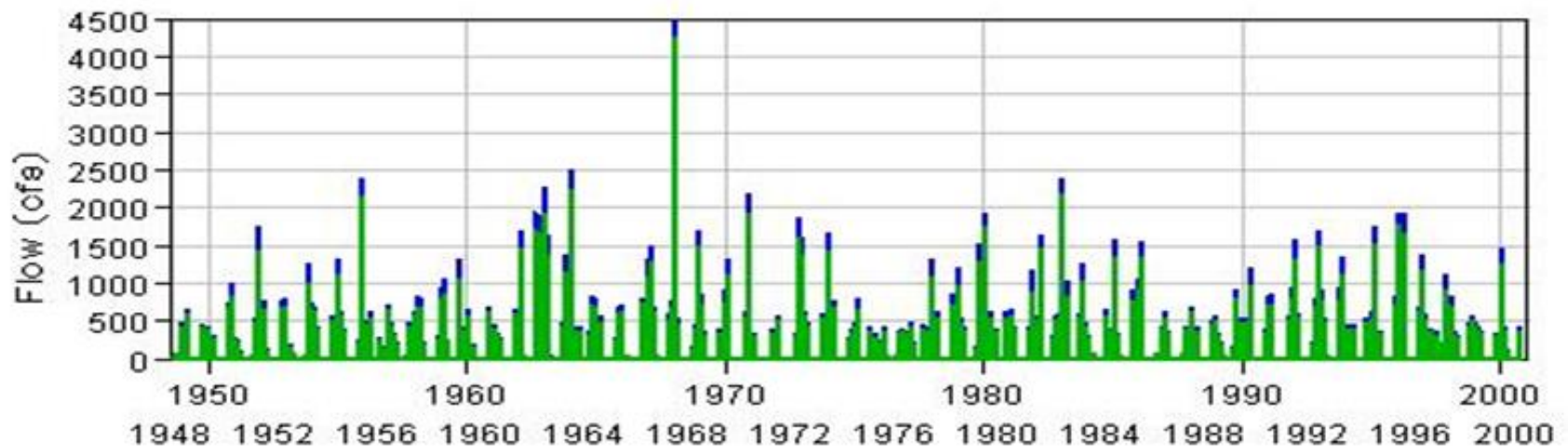
Peak Flow Matching vs. Volume and Duration Control



Flow Control Strategy Options

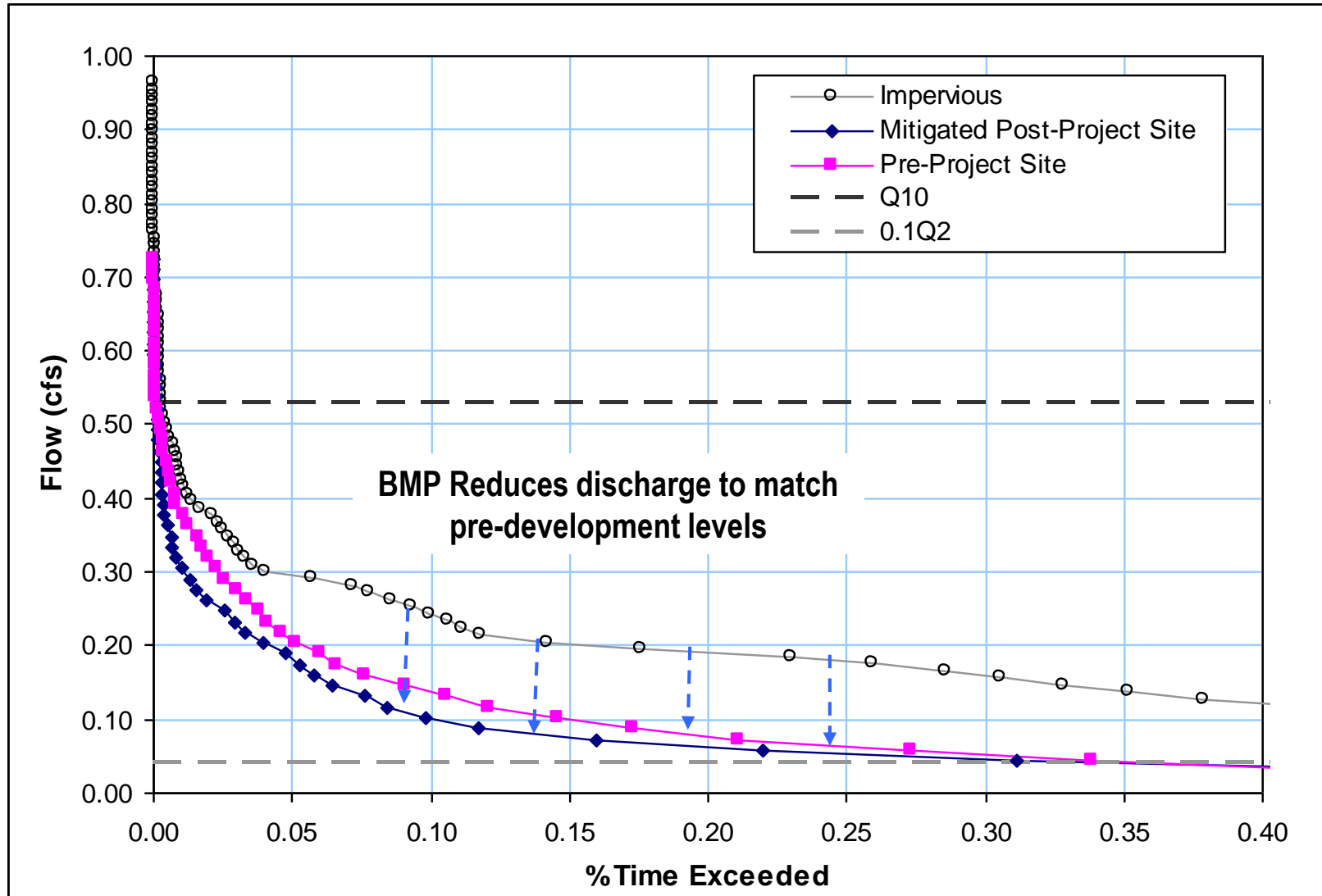
Flow Duration Matching

- Simulate long-term rainfall record.
- Evaluate and compare the duration of peak flows for pre- and post- development conditions.
- Design facility to match flow durations for range of flows that cause channel movement.
- Continuous simulation model required.



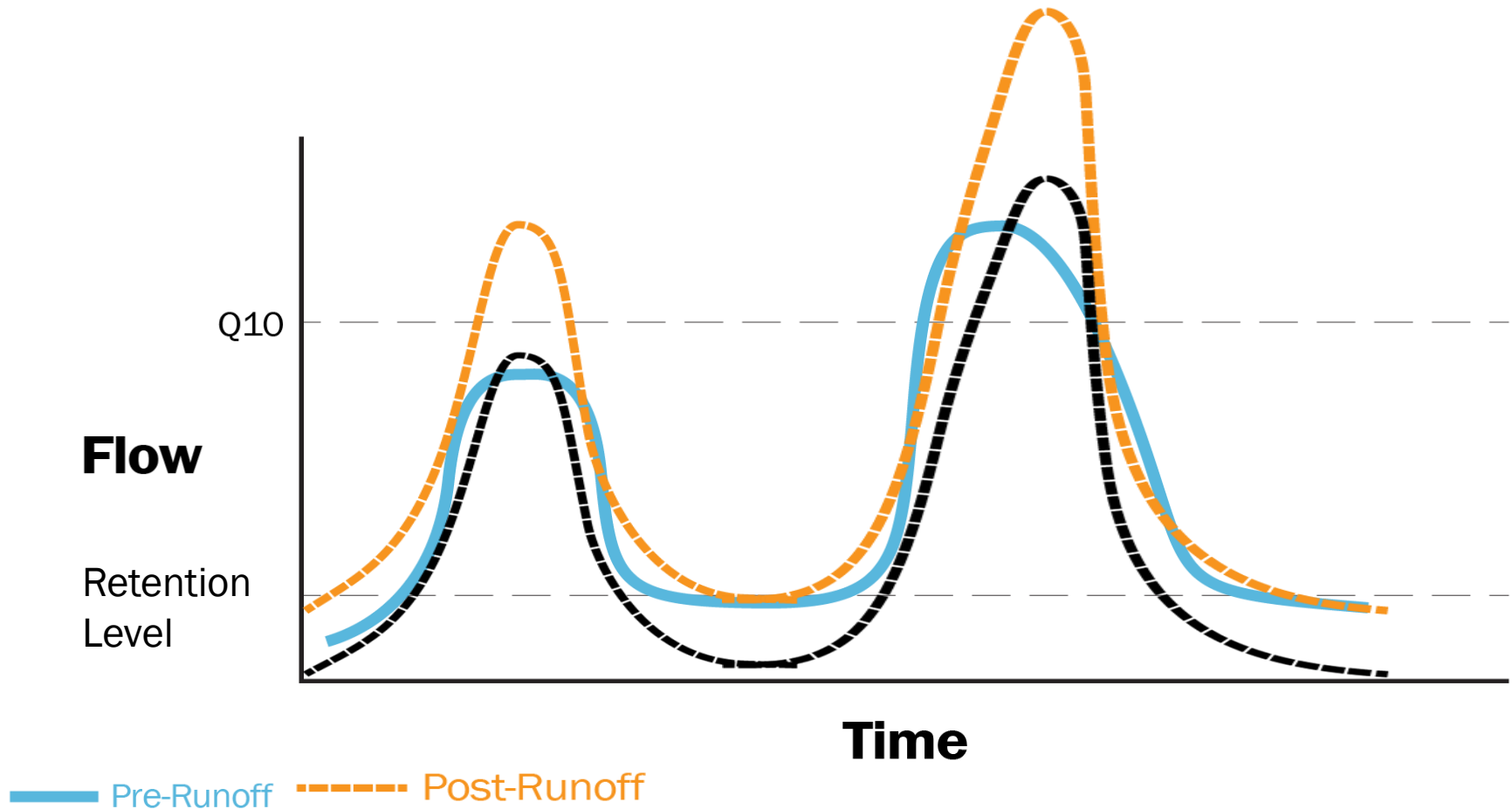
Flow Control Strategy Options

Flow Duration Matching



Flow Control Strategy Options

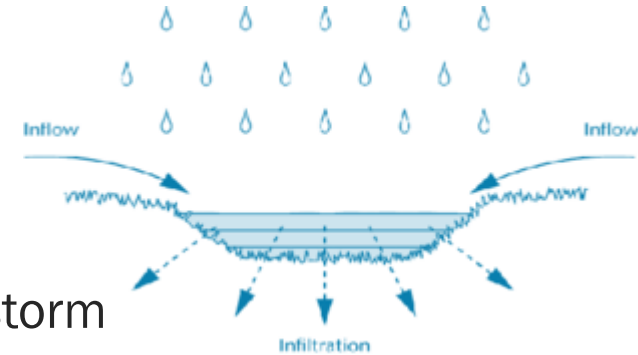
Retention/Infiltration Standard



Flow Control Strategy Options

Retention/Infiltration Standard

- Examples:
 - Current – Infiltrate $\frac{1}{2}$ inch storm
 - Lake Oswego – Infiltrate the 10-year Storm
 - California Examples – Retain the 85 percentile storm
- Typically based on synthetic event-based sizing
- Does not require complex modeling
- Challenging to implement in areas where infiltration is not feasible
- Does not account for pre-development runoff conditions



Discussion Questions

- Should the manual include flow control provisions to address hydromodification?
- Will the flow control standard be based on...
 - Peak flow matching
 - Flow duration matching
 - Retention/Infiltration standard
- (next workshop) What sizing tool(s) will be allowed?

Policy and Technical Issues

Definitions

Questions to Consider

- Should there be a distinction between new development and redevelopment projects?
- How will the pre-development condition be defined for sizing flow control facilities?

Current Definition (CCSD#1 and SWMACC)

- Pre-Development
 - Conditions at the site immediately before application for development. Man-made site alterations or activities made without an approved development permit will not be considered as pre-developed conditions.
- Redevelopment projects can assume “pre” condition includes existing impervious surface

Predeveloped Condition Comparison Jurisdictions

- Most do not distinguish between undeveloped and redeveloped sites
- Portland
 - Ground cover and grading prior to any development taking place (i.e., Lewis & Clark days).
- CWS
 - No clear definition
- Oregon City
 - Map of conditions prior to settlement (forested)
- Lake Oswego
 - All sites use Curve Number 70
- Clark County
 - Vegetation prior to Euro-American settlement (forested) unless historic evidence shows prairie

2010 Draft WES Manual

- Pre-developed Conditions for Undeveloped Land
 - Conditions at the site immediately before application for development. Man-made site alterations or activities made without an approved development permit will not be considered as pre-developed conditions. For the purposes of hydrologic modeling the pre-developed conditions for undeveloped land will use the condition of the site as shown on the 2008 aerial photography on record with the District.
- Pre-developed Conditions for Developed Land
 - The conditions of the land prior to the original development. For the purposes of hydrologic modeling the pre-developed conditions for developed land will use the condition of the land prior to the original development.

Discussion and Decisions

- Should there be a distinction between new development and redevelopment projects?
- How will the pre-development condition be defined for sizing flow control facilities?

Policy and Technical Issues

LID/Green Infrastructure Approach



Questions to Consider

- How will policies and standards prioritize the use of LID and GI?
- Will the LID approach include site development requirements or focus only on facility types?
- Will there be a facility selection hierarchy?
- Will applicants be required to “prove the negative” for the use of LID before moving to traditional approaches?

LID/GI Requirements NPDES Permit

“3) Prioritize and include implementation of Low-Impact Development (LID), Green Infrastructure (GI) or equivalent design and construction approaches.”

(Schedule A.4.f.i)

“...the co-permittee must develop or reference an enforceable post-construction stormwater quality manual or equivalent document... [that] includes the following:

“3) Applicable LID, GI, or similar stormwater runoff reduction approaches, including the practical use of these approaches.

“4) Conditions where the implementation of LID, GI, or equivalent approaches may be impracticable.”

(Schedule A.4.f.iii)

“Identify, and where practicable, minimize or eliminate ordinance, code and development standard barriers that inhibit design and implementation techniques intended to minimize impervious surfaces and reduce stormwater runoff (e.g. Low Impact Development, Green Infrastructure).”

(Schedule A.4.f.ii)

LID/GI Requirements Comparison Jurisdictions



	Site Design Requirements	GI Facilities Included	Facility Selection Hierarchy
Portland		X	X
CWS	X	X	
Salem	X	X	XX
Oregon City	X	X	X
Lake Oswego	X	X	X
Clark County	X	X	X

Discussion

- How will policies and standards prioritize the use of LID and GI?
- Will the LID approach include site development requirements or focus only on facility types?
- Will there be a facility selection hierarchy?
- Will applicants be required to “prove the negative” for the use of LID before moving to traditional approaches?

Wrap Up

Summarize Decisions



- Thresholds and Exemptions
- Flow Control Strategy
- Definitions
- LID/Green Infrastructure Approach

- Follow-up Assignments

Workshop #2



- Tuesday, August 21 from 1:00-4:00
- Stormwater Facility Selection and Design Criteria
- Calculations/Sizing Methods