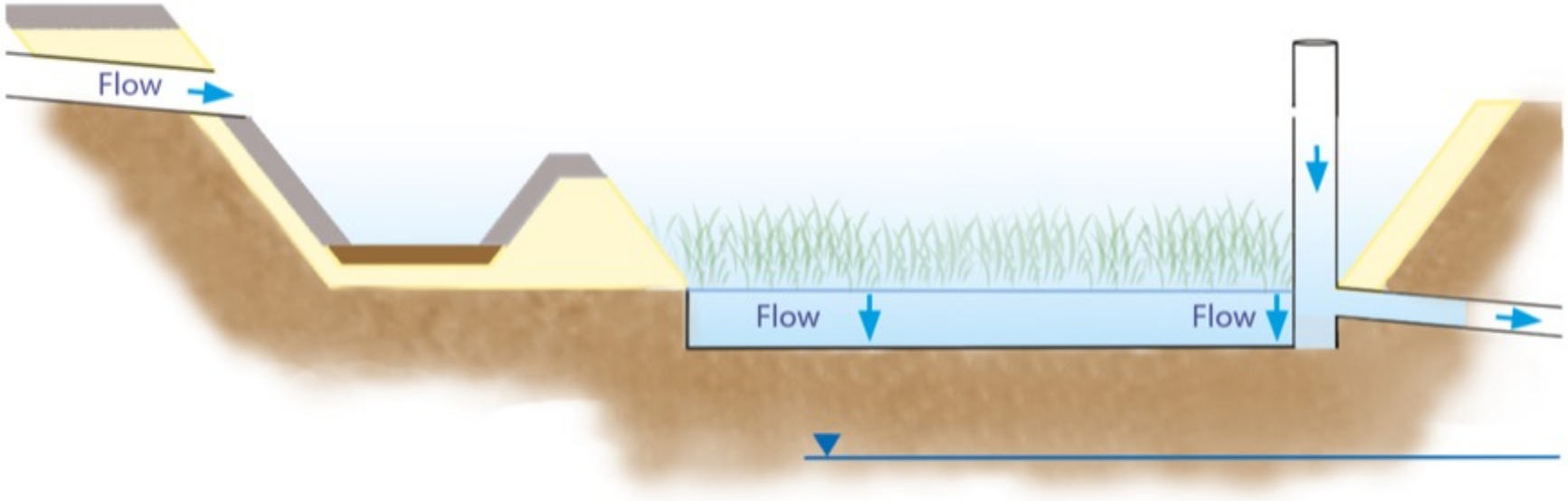
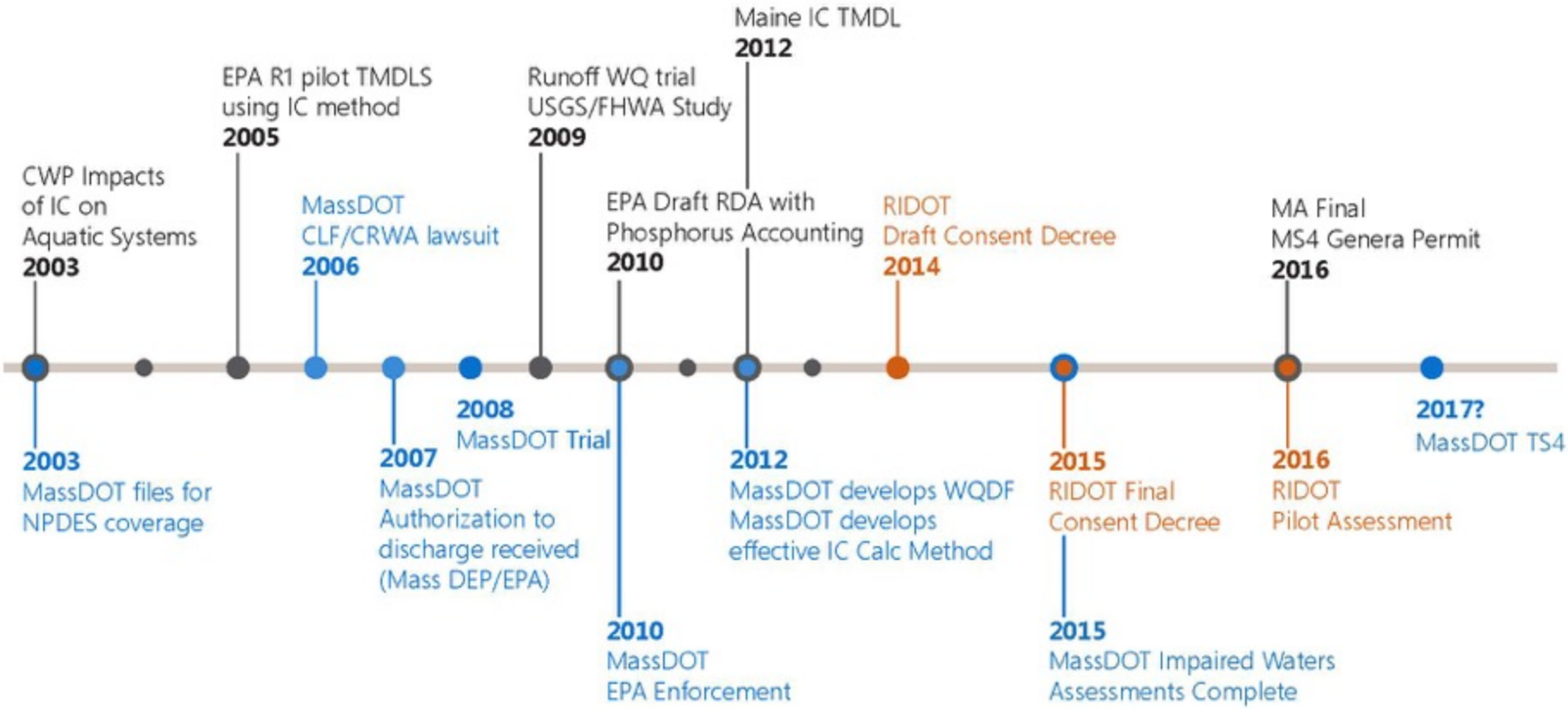


Innovative BMP Crediting

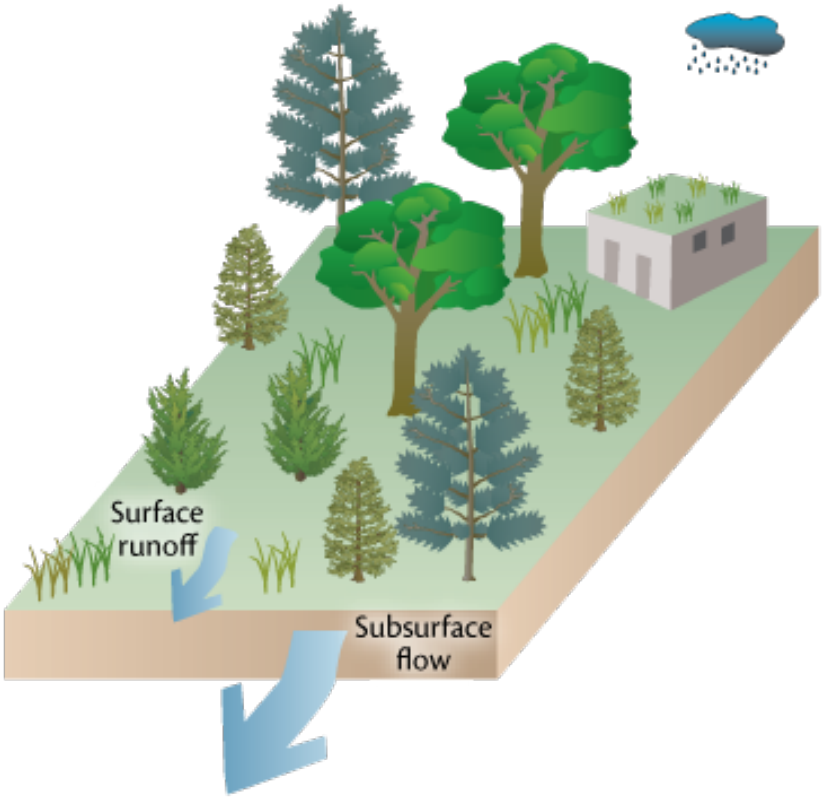
Presented by
Theresa McGovern - VHB

January 24, 2017

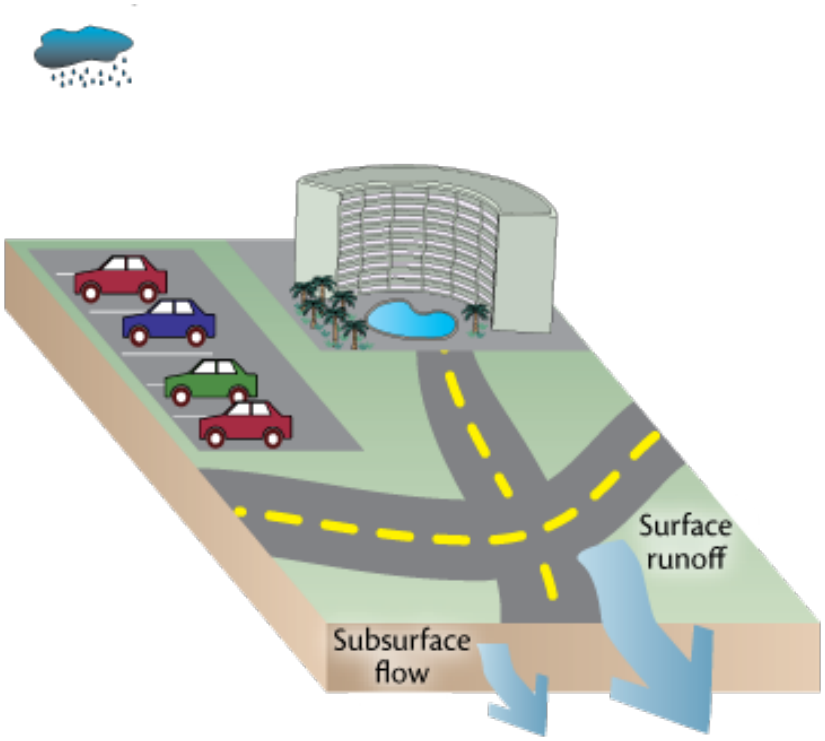

2003
MassDOT files for NPDES coverage
2006
MassDOT CLF/CRWA lawsuit
2007
MassDOT Authorization to discharge received (Mass DEP/EPA)
2008
MassDOT Trial
2010
MassDOT EPA Enforcement
2012
MassDOT develops WQDF
MassDOT develops effective IC Calc Method
2014
RIDOT Draft Consent Decree
2015
RIDOT Final Consent Decree
2015
MassDOT Impaired Waters Assessments Complete
2016
RIDOT Pilot Assessment
2017?
MassDOT TS4


CWP Impacts of IC on Aquatic Systems
2003
EPA R1 pilot TMDLS using IC method
2005
MassDOT CLF/CRWA lawsuit
2006
Runoff WQ trial USGS/FHWA Study
2009
Maine IC TMDL
2012
EPA Draft RDA with Phosphorus Accounting
2010
RIDOT Draft Consent Decree
2014
MA Final MS4 Genera Permit
2016
2003
MassDOT files for NPDES coverage
2007
MassDOT Authorization to discharge received (Mass DEP/EPA)
2008
MassDOT Trial
2010
MassDOT EPA Enforcement
2012
MassDOT develops WQDF
MassDOT develops effective IC Calc Method
2015
RIDOT Final Consent Decree
2015
MassDOT Impaired Waters Assessments Complete
2016
RIDOT Pilot Assessment
2017?
MassDOT TS4

Pre Development Watershed

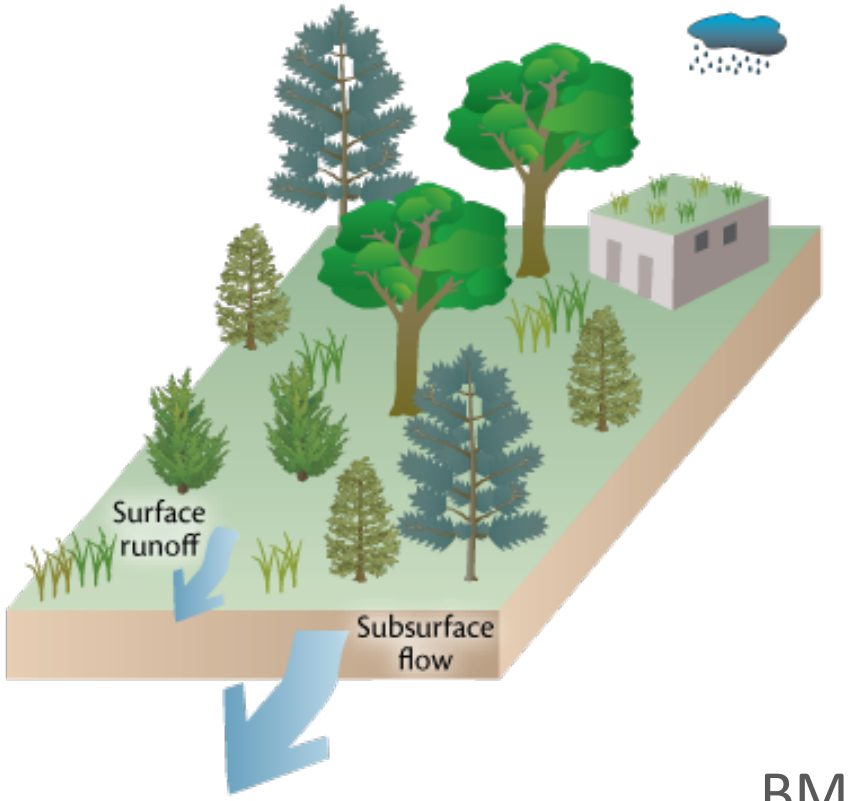


Post Development Watershed

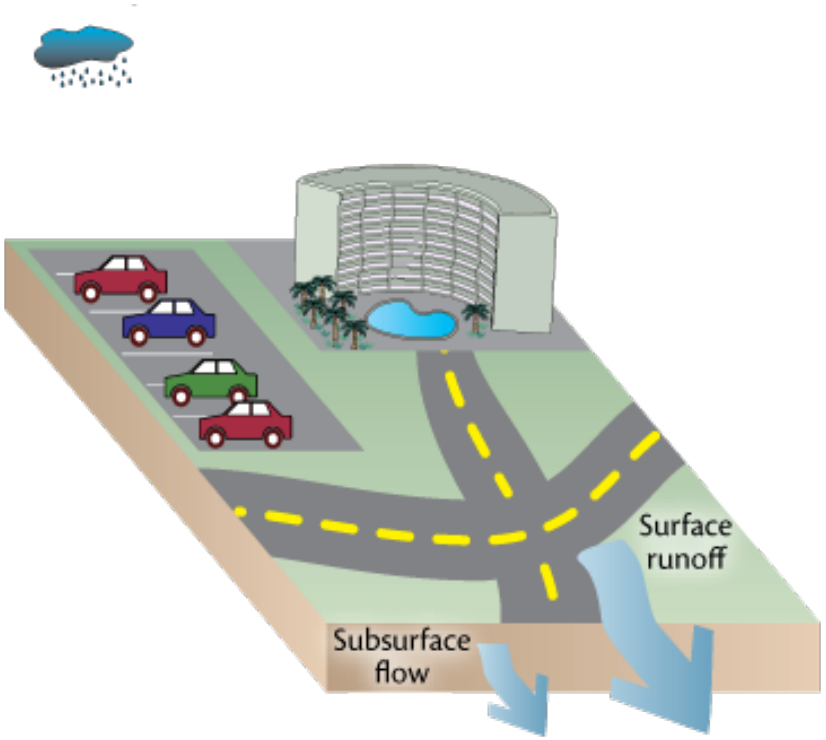


Images from http://www.mdcoastalbays.org/

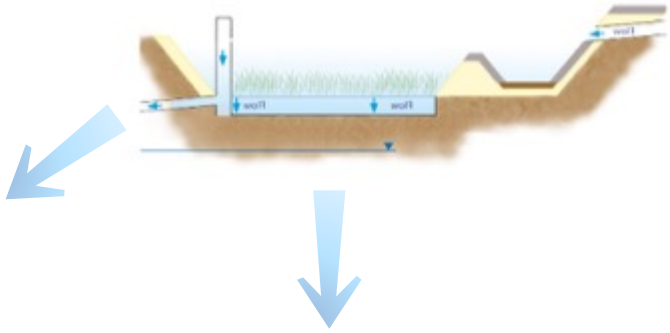
Pre Development Watershed



Post Development Watershed



BMP Output



Images from http://www.mdcoastalbays.org/

Accounting Approach

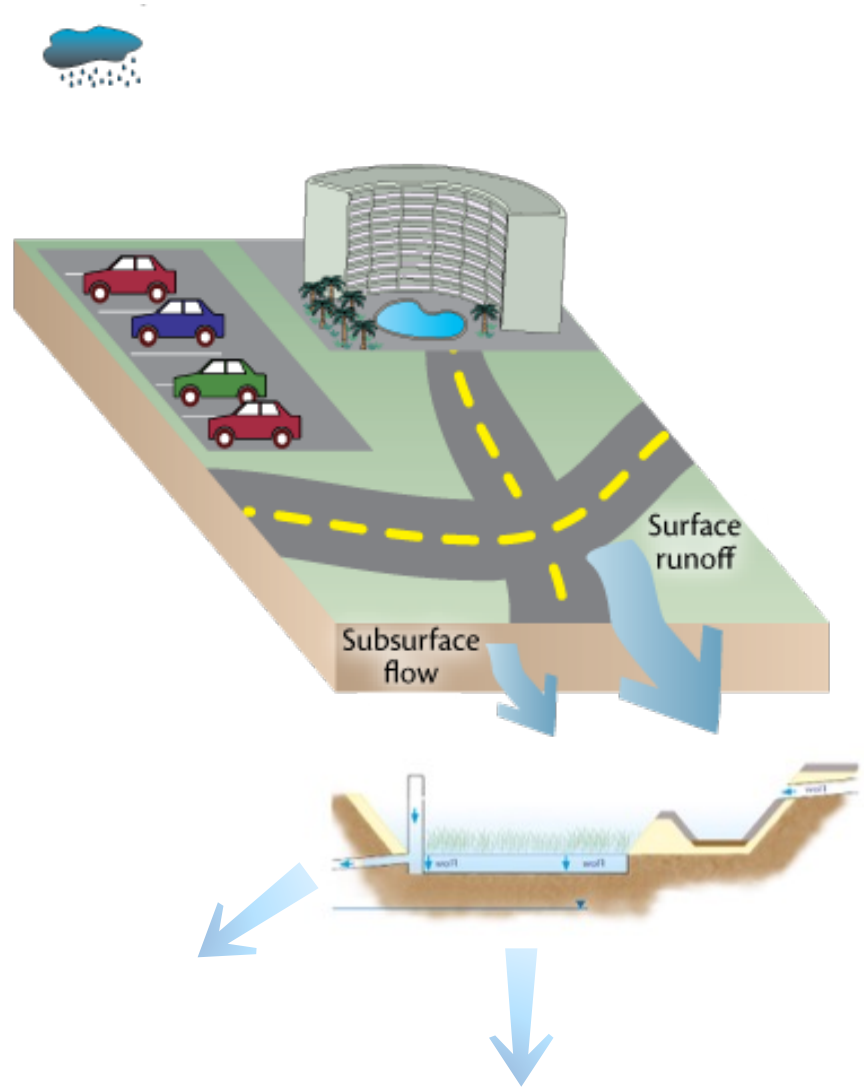
Watershed Loads

Pollutants

BMP Categories / Configurations

Pollutant Reductions

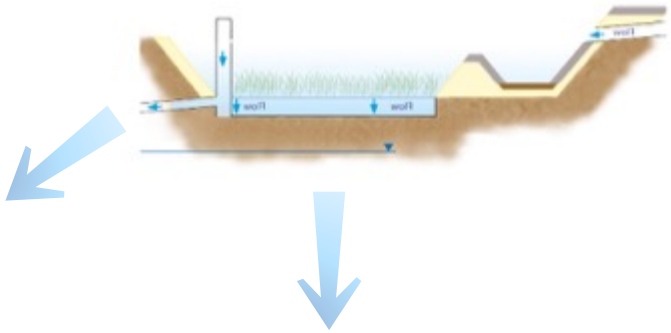
Effective IC Reductions



Results

- Watershed Load Estimates
  - Pervious → EPA
  - Impervious → USGS via SELMD
- BMP Pollutant Reductions
  - TMDL → Phos, Nitrogen, TSS and Zn → EPA
  - Bacteria / No TMDL → IC Method → VHB

Effective IC Calculation



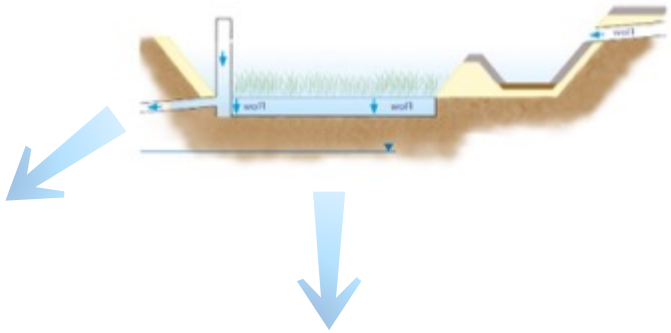
Pervious Cover Factor = how much like pervious

0 = impervious

1 = pervious)

$$Pervious\ Cover\ Factor = \frac{[2 \times Pollutant\ Factor + Runoff\ Factor + Peak\ Q\ Factor]}{4}$$

Effective IC Calculation



Pervious Cover Factor = how much like pervious

0 = impervious

1 = pervious)

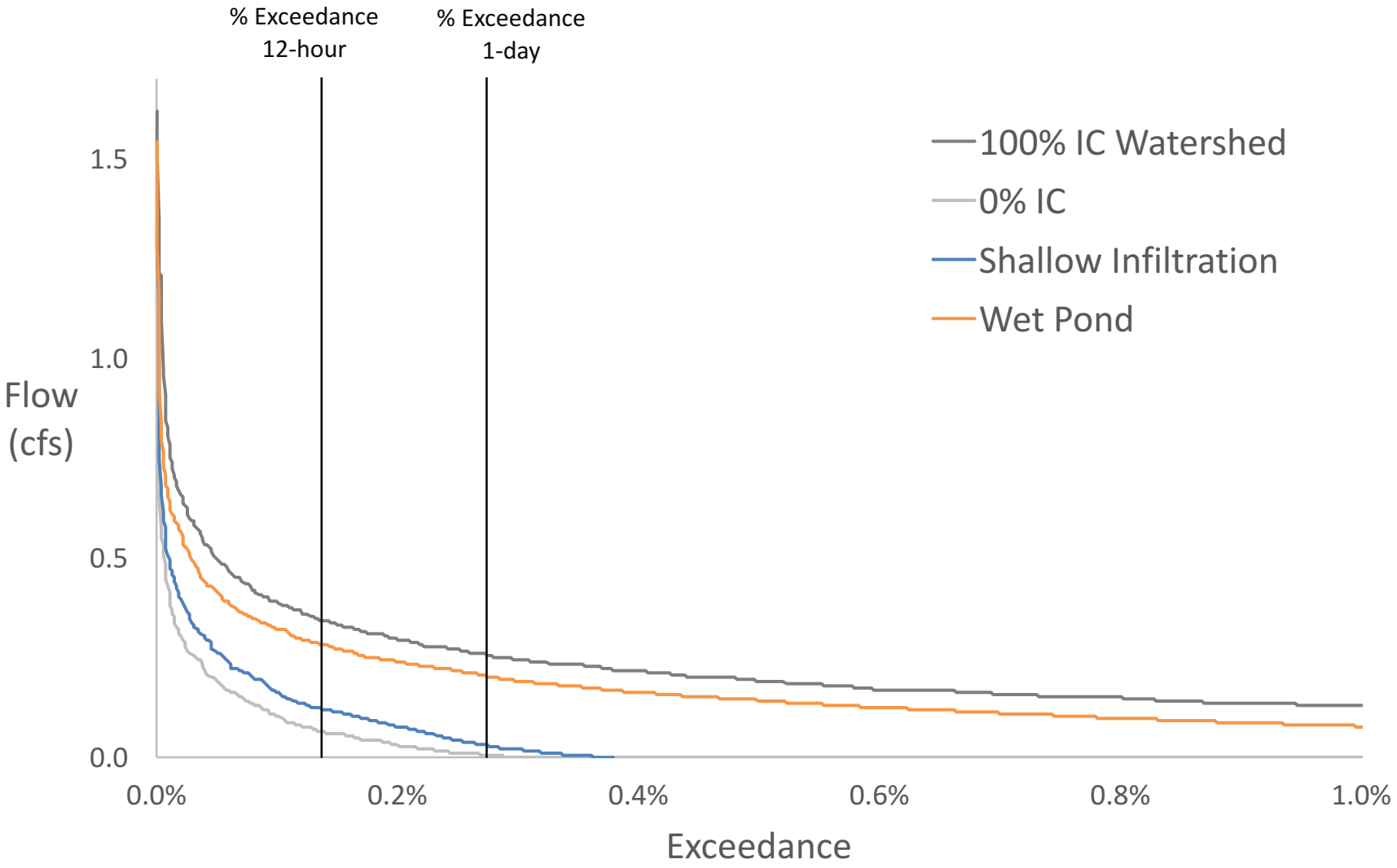
$$Pervious\ Cover\ Factor = \frac{[2 \times Pollutant\ Factor + Runoff\ Factor + Peak\ Q\ Factor]}{4}$$

Total Phosphorus: % Reduction / 0.9

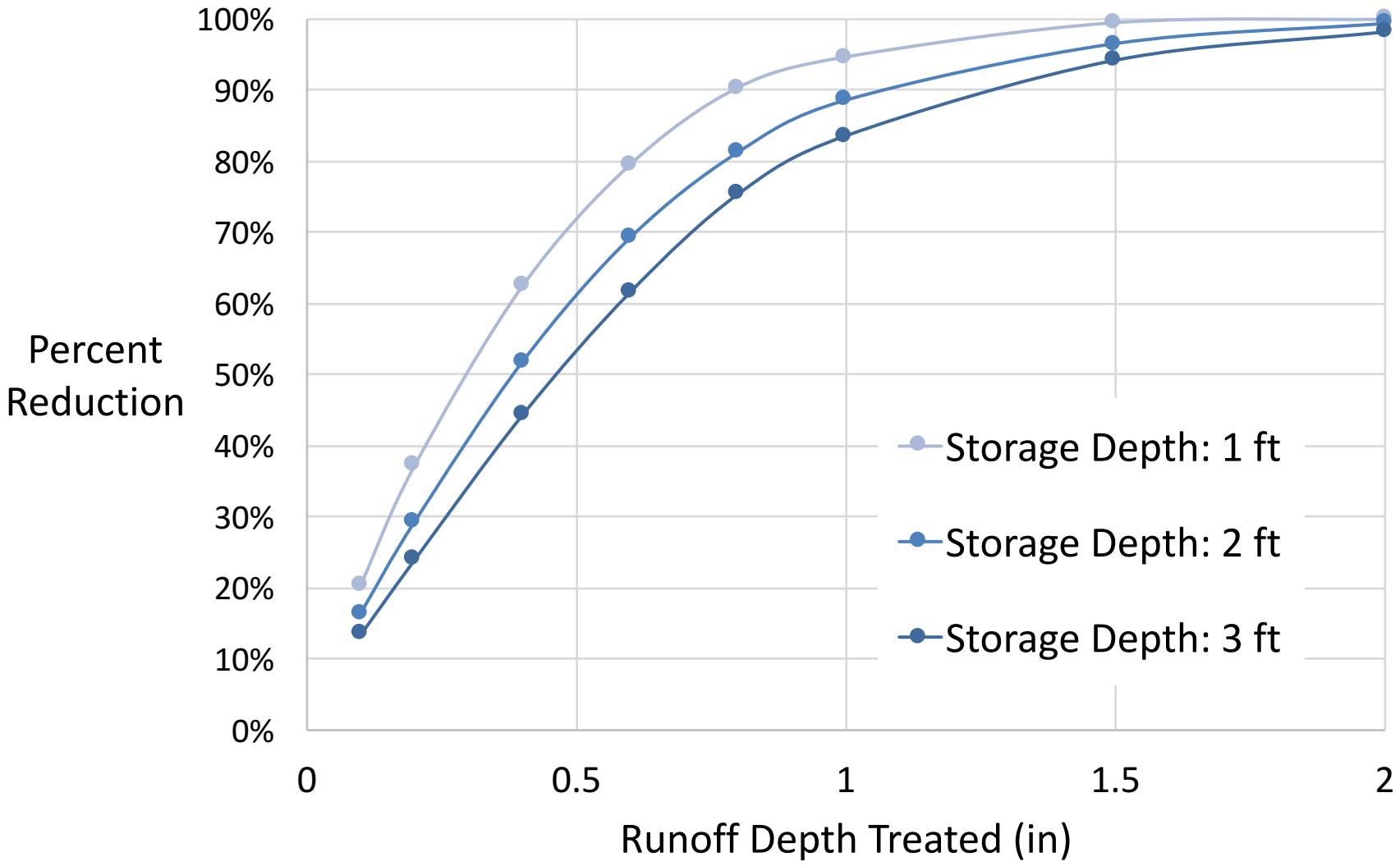
Runoff Reduction: % Reduction / 0.9

12-Hour Peak Rate

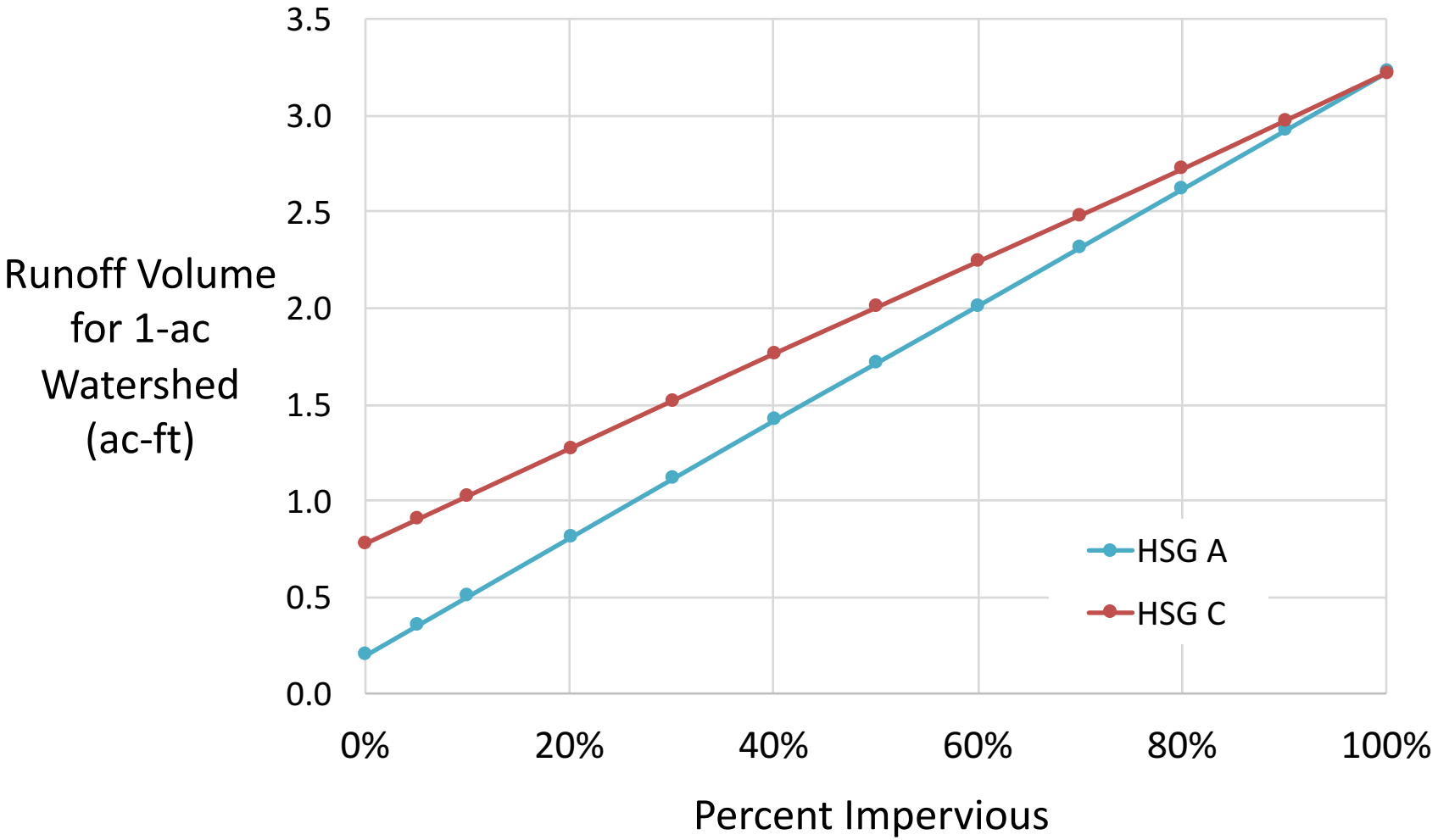
Peak Rate Factor



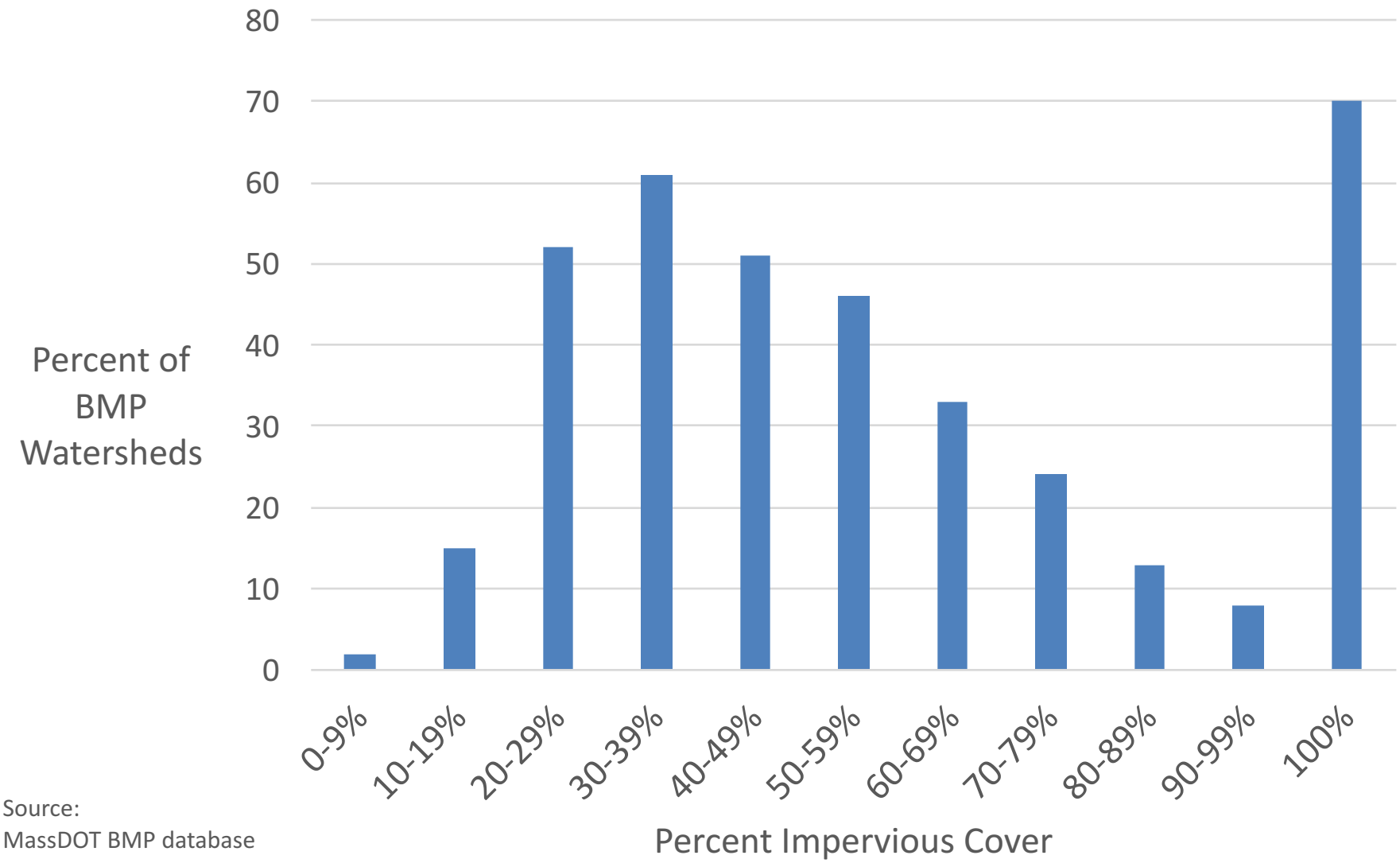
Sensitivity Analysis
Infiltration BMP Depth



Sensitivity Analysis
Reference Watershed Soil Type

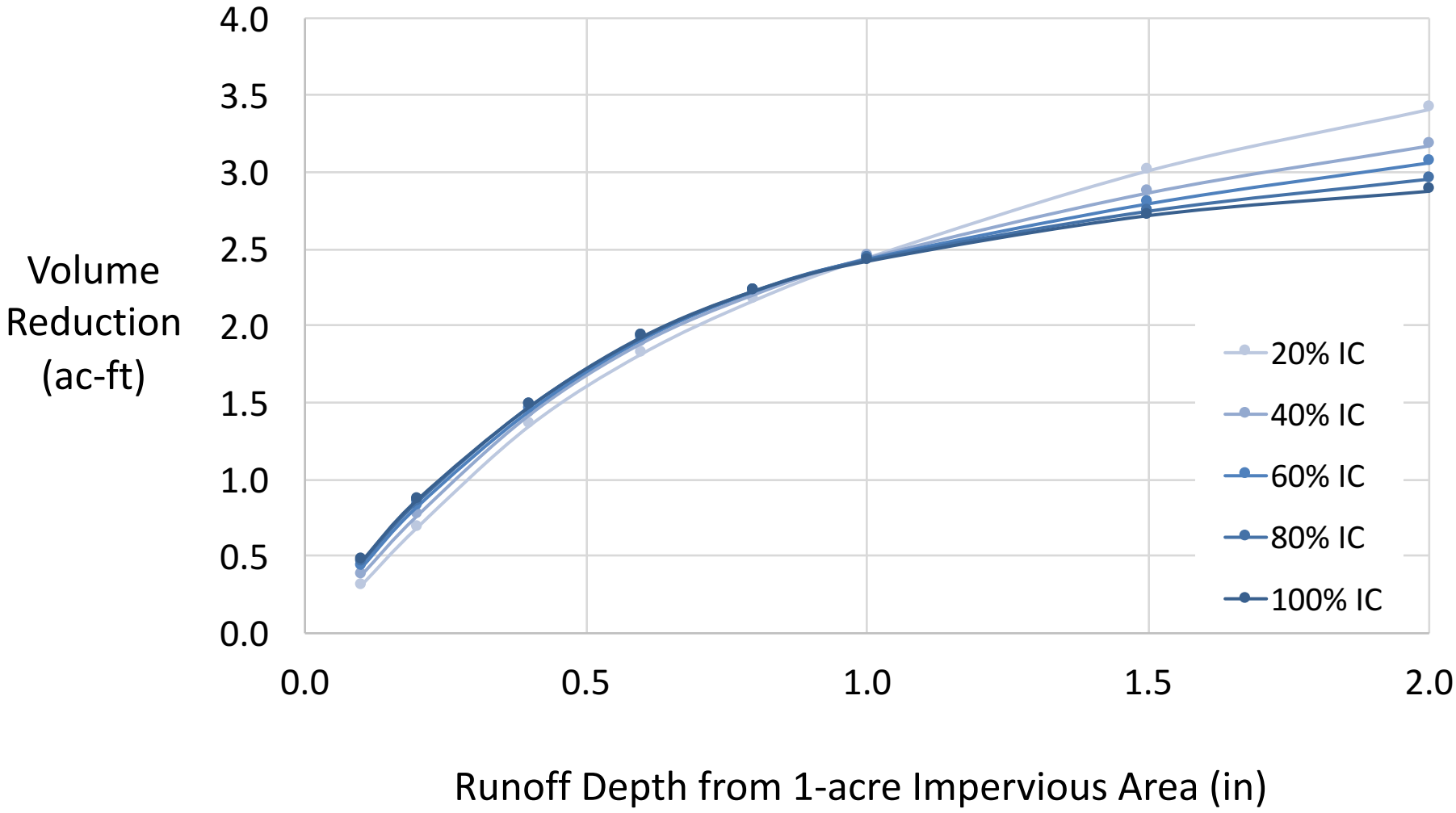


Sensitivity Analysis
%IC of BMP Watershed

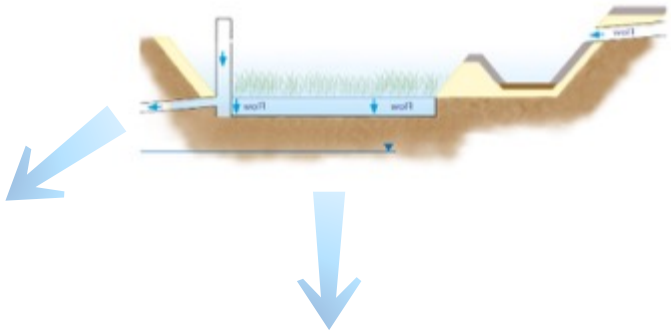


Source:
MassDOT BMP database

Sensitivity Analysis
%IC of BMP Watershed



Effective IC Calculation



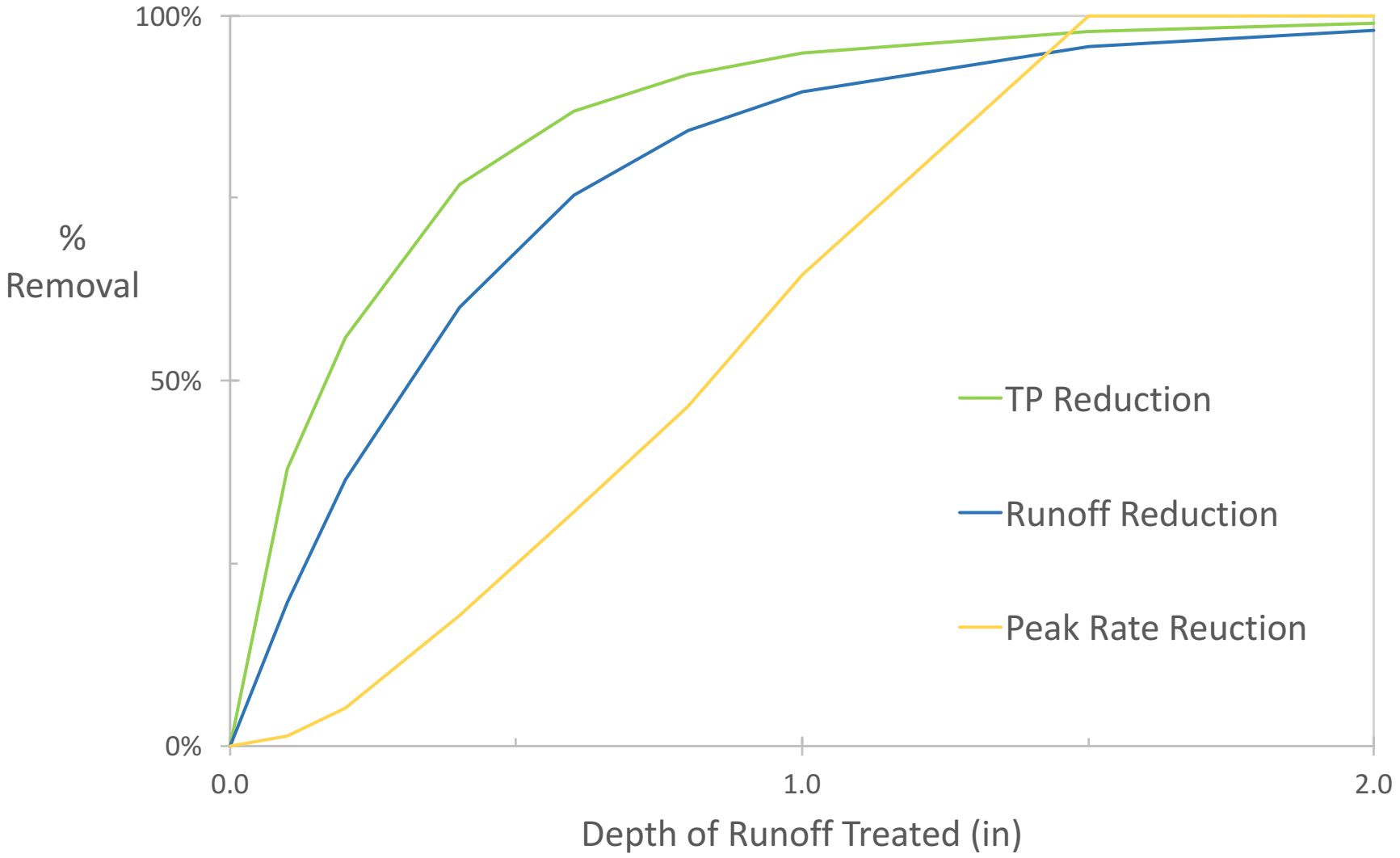
Pervious Cover Factor = how much like pervious

0 = impervious

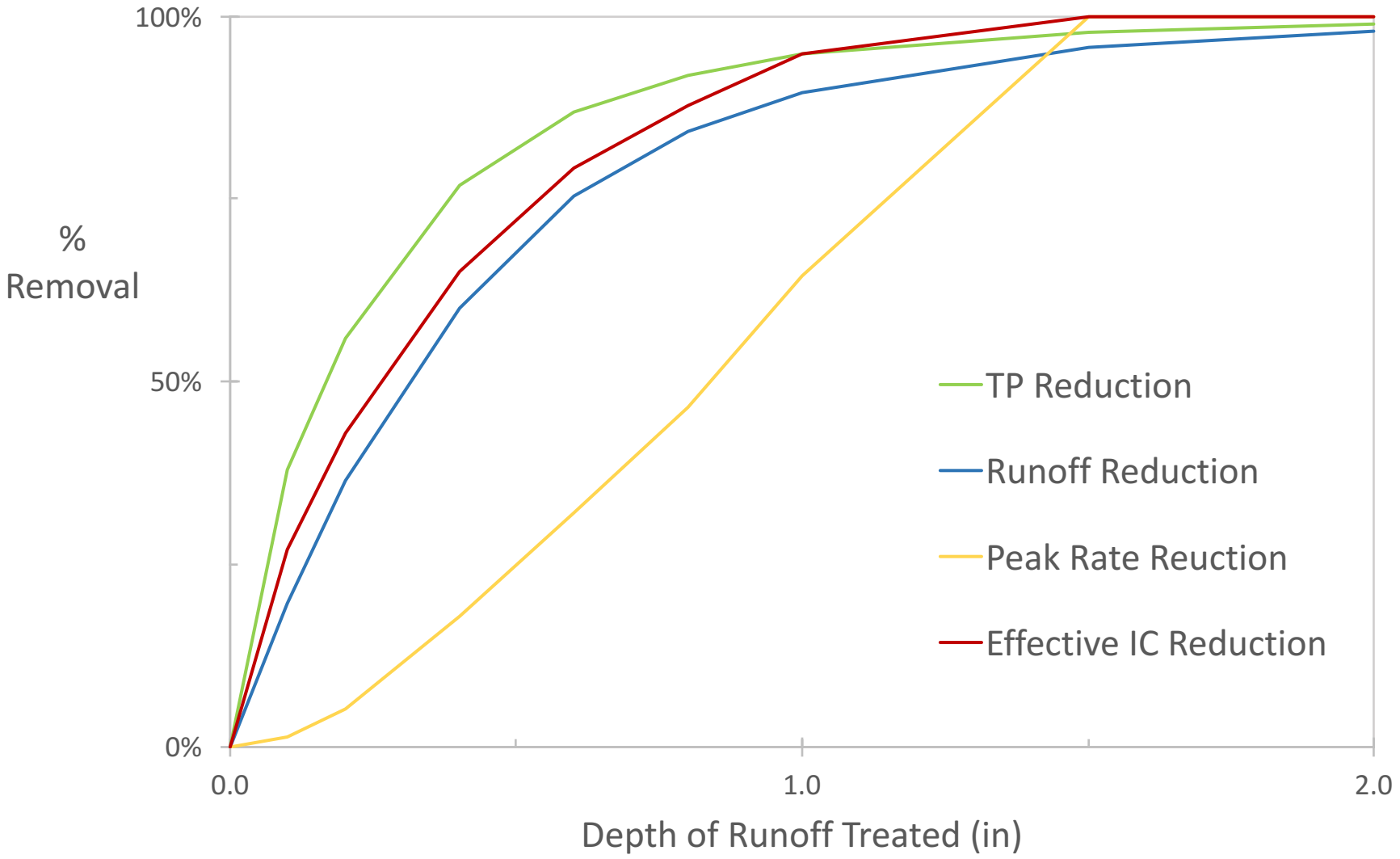
1 = pervious)

$$Pervious\ Cover\ Factor = \frac{[2 \times Pollutant\ Factor + Runoff\ Factor + Peak\ Q\ Factor]}{4}$$

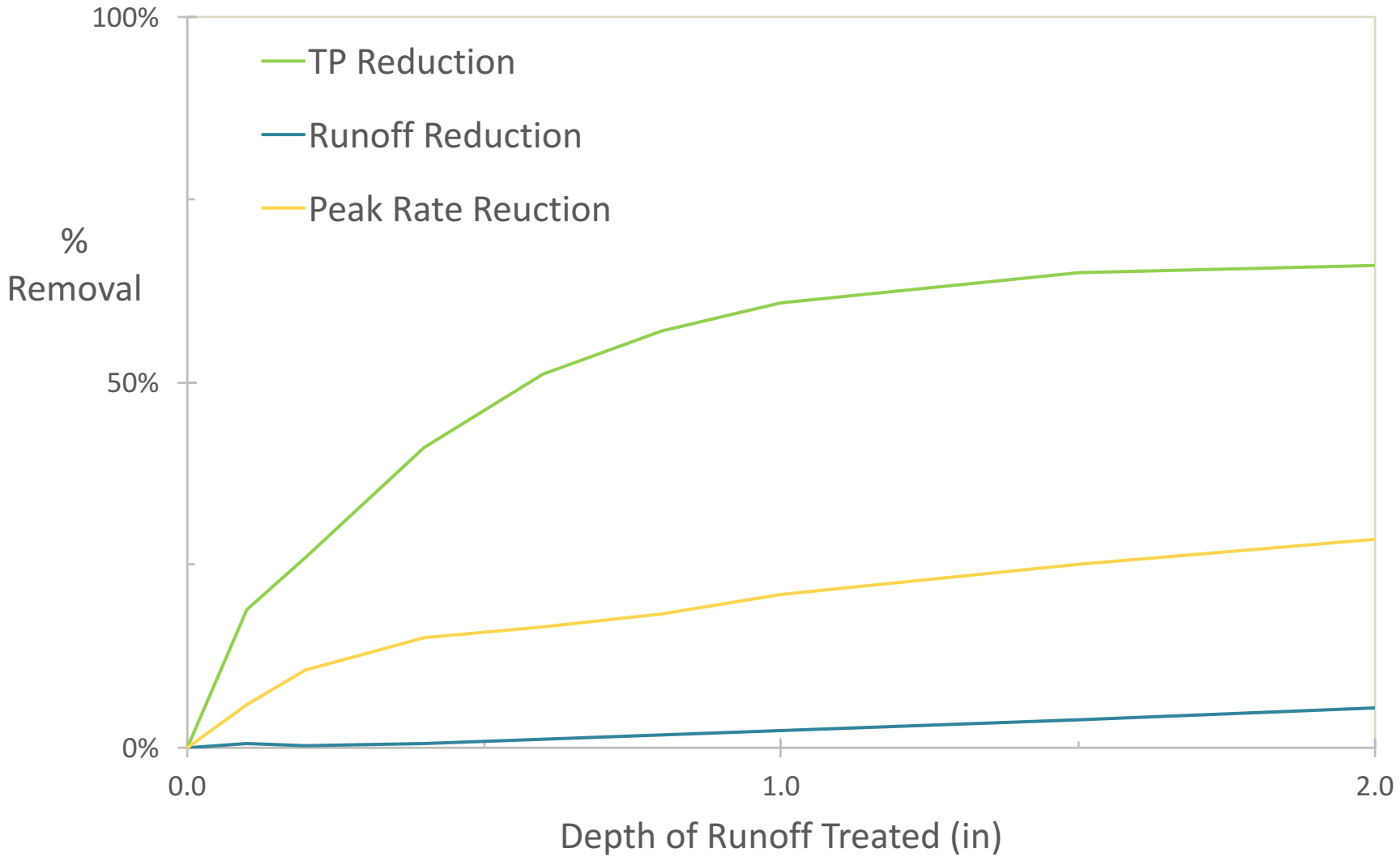
Shallow Infiltration BMP Effective IC Calcs



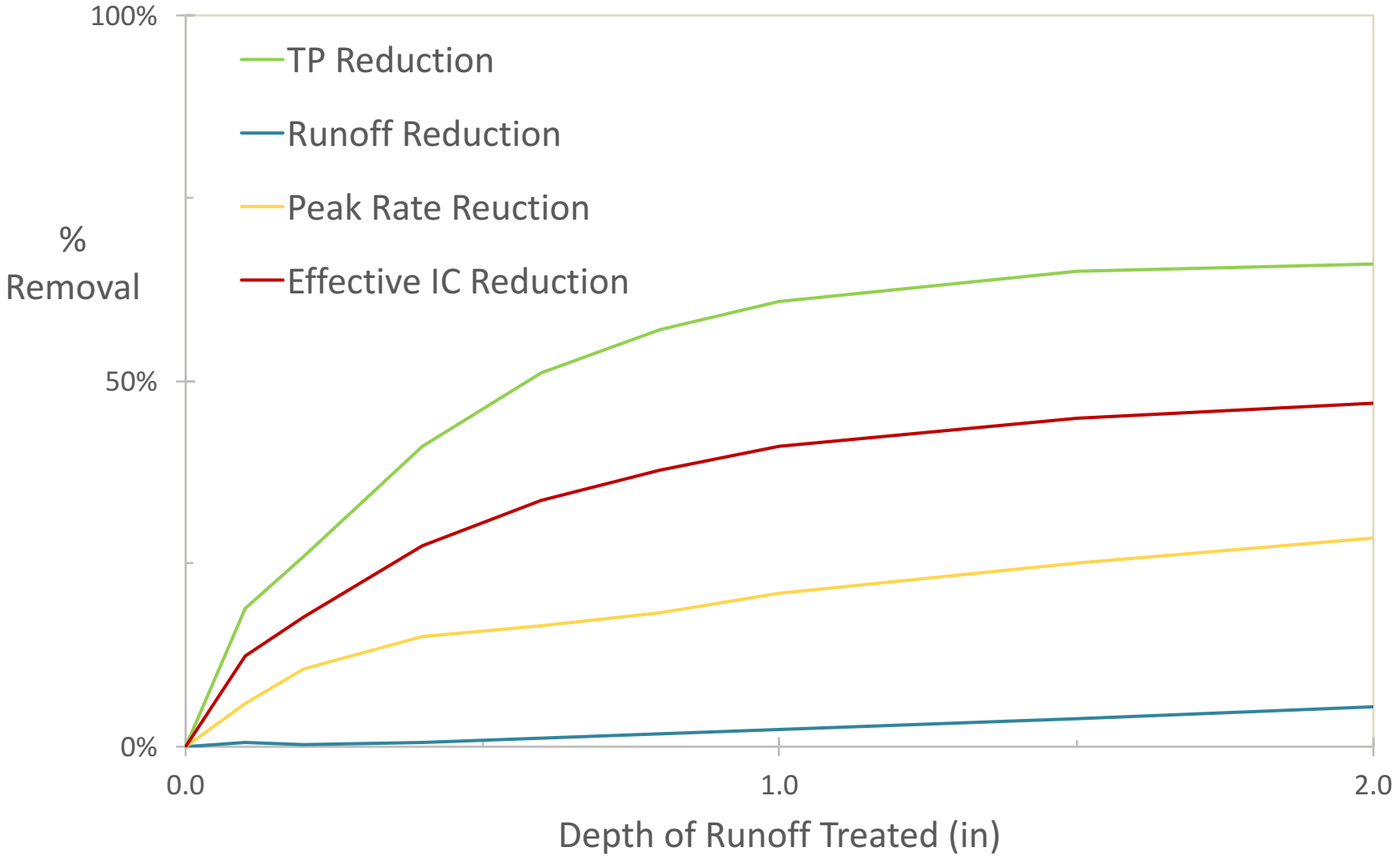
Shallow Infiltration BMP Effective IC Calcs



Gravel Wetland BMP Effective IC Calcs



Gravel Wetland BMP Effective IC Calcs

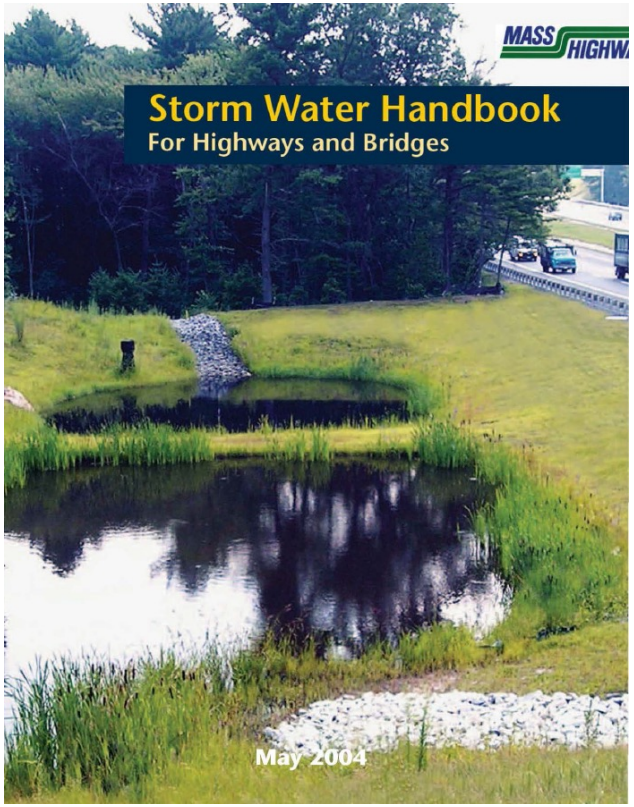


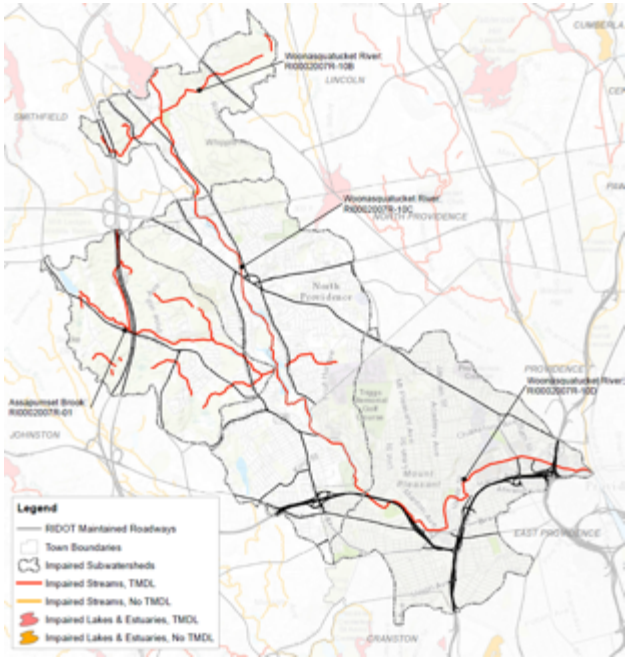
Additional Drivers for Use

- IC and Flow or Volume based TMDLs
- MS4 Compliance Tracking – eg. CT
- Stormwater Utility Credits
- Recharge Requirements
- Peak Rate Attenuation Requirements

Summary and Next Steps

- Finalize Methodology with EPA
- MassDOT Handbook and WQDF Updates
- RIDOT Stormwater Control Plans





Theresa McGovern| tmcgovern@vhb.com

www.vhb.com

Offices located throughout the east coast