

# NPDES Phase II Small MS4 Permit Program

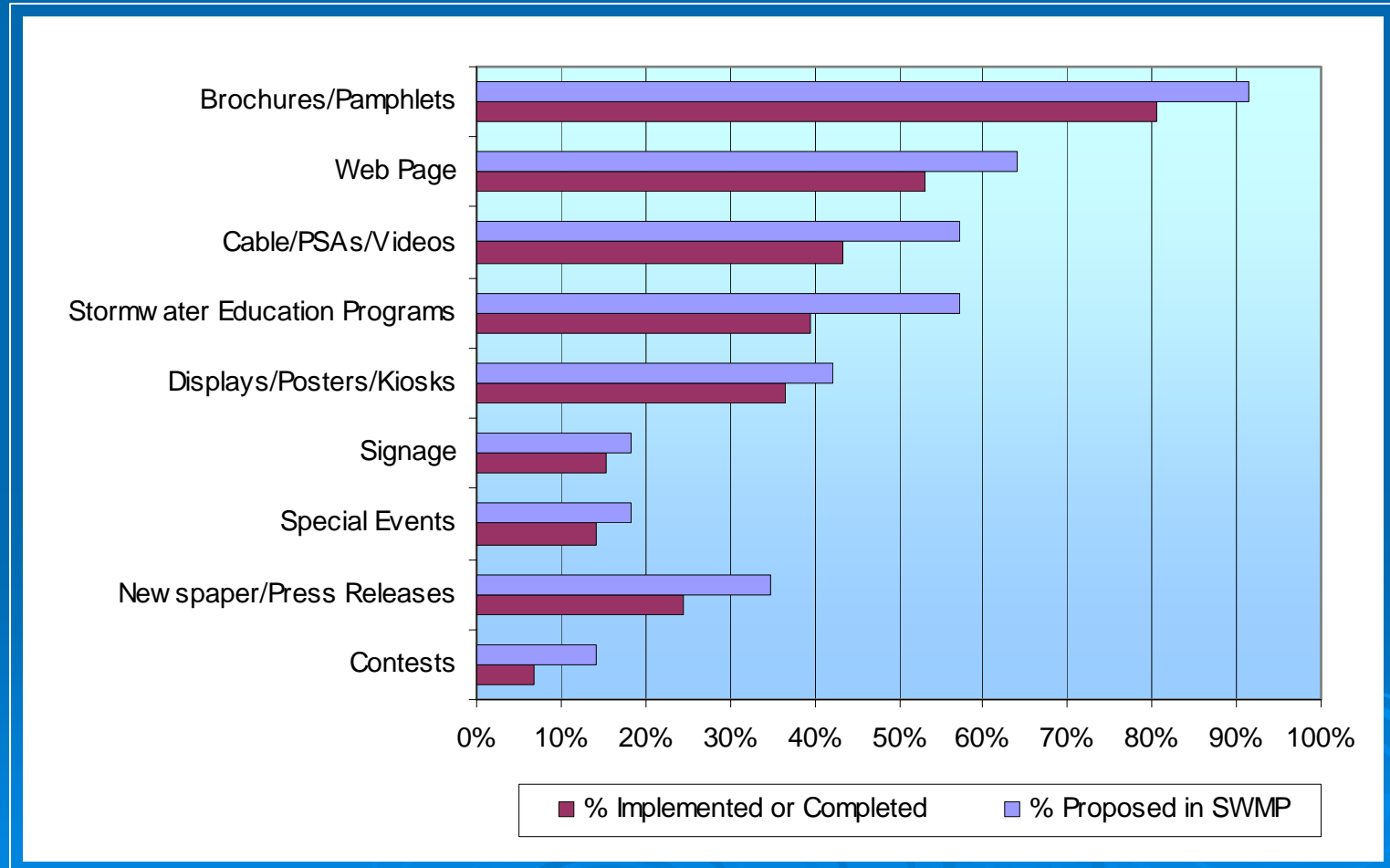
SWMP MCM Summaries  
& Select Metrics  
Permit Year 6 (2008-2009)



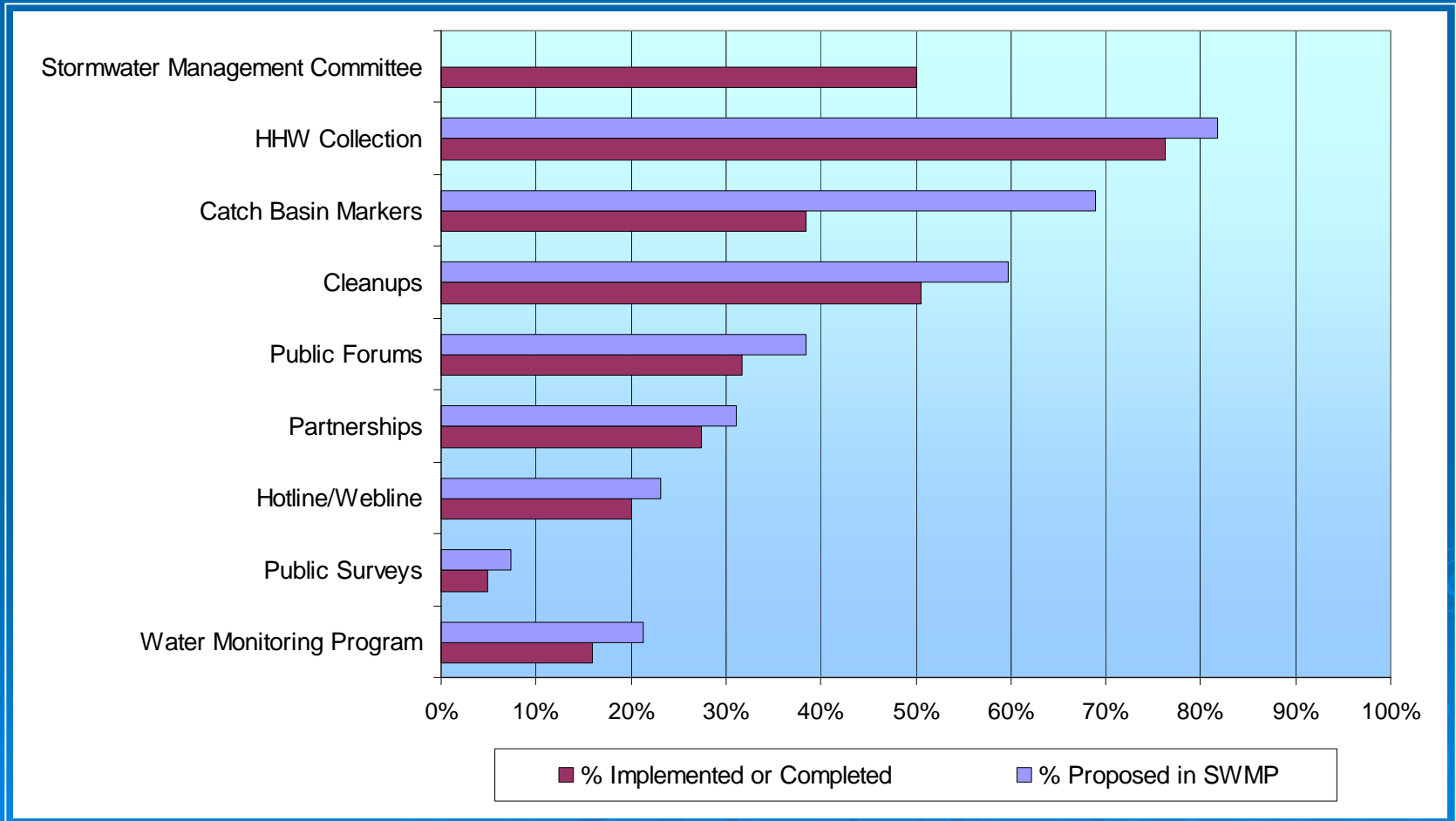
MA Cities and Towns Only  
(164 of 238 Reporting)

# MCM #1 - Education & Outreach Practices

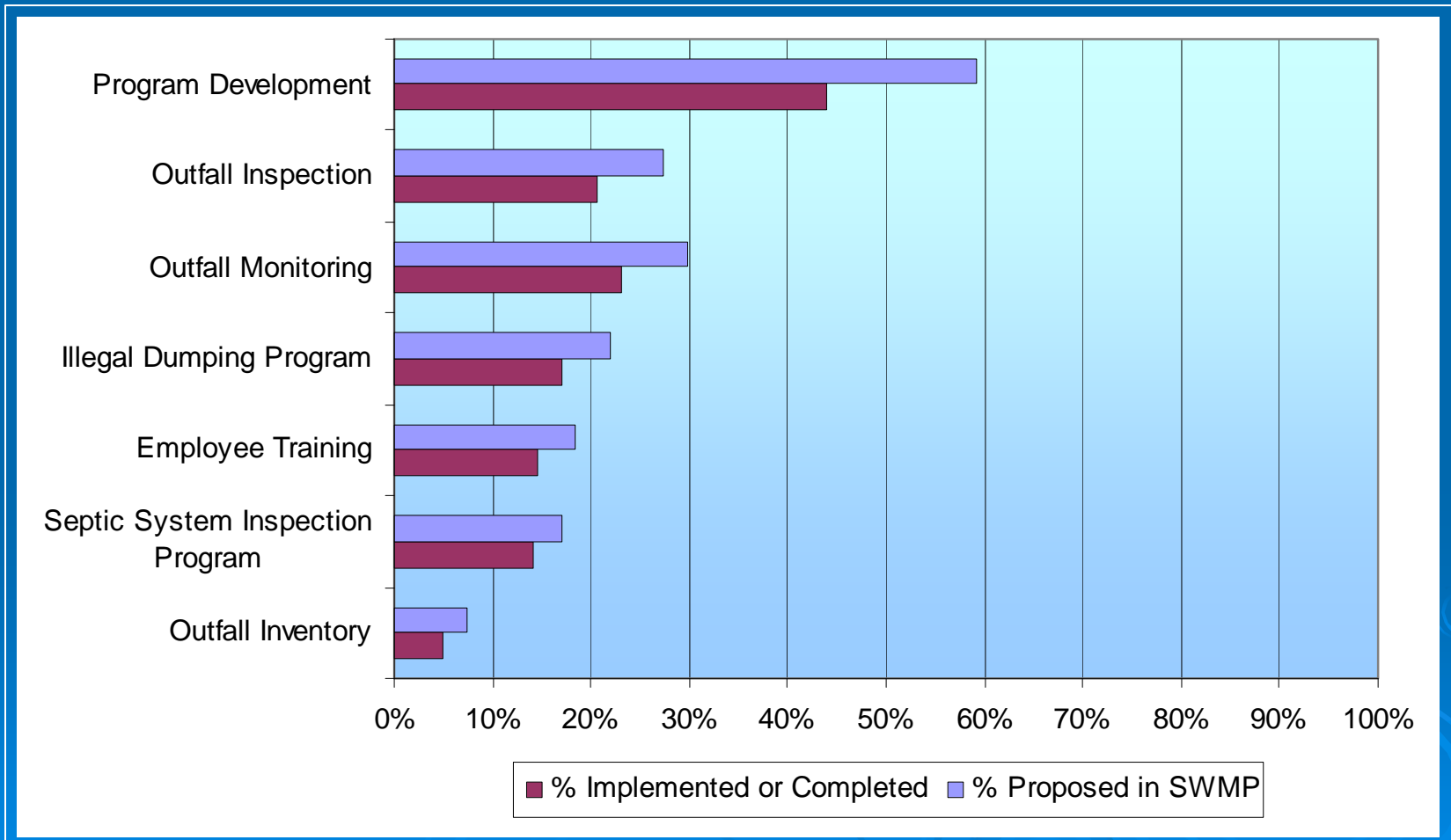
## Reported Status of Practices Proposed in SWMP



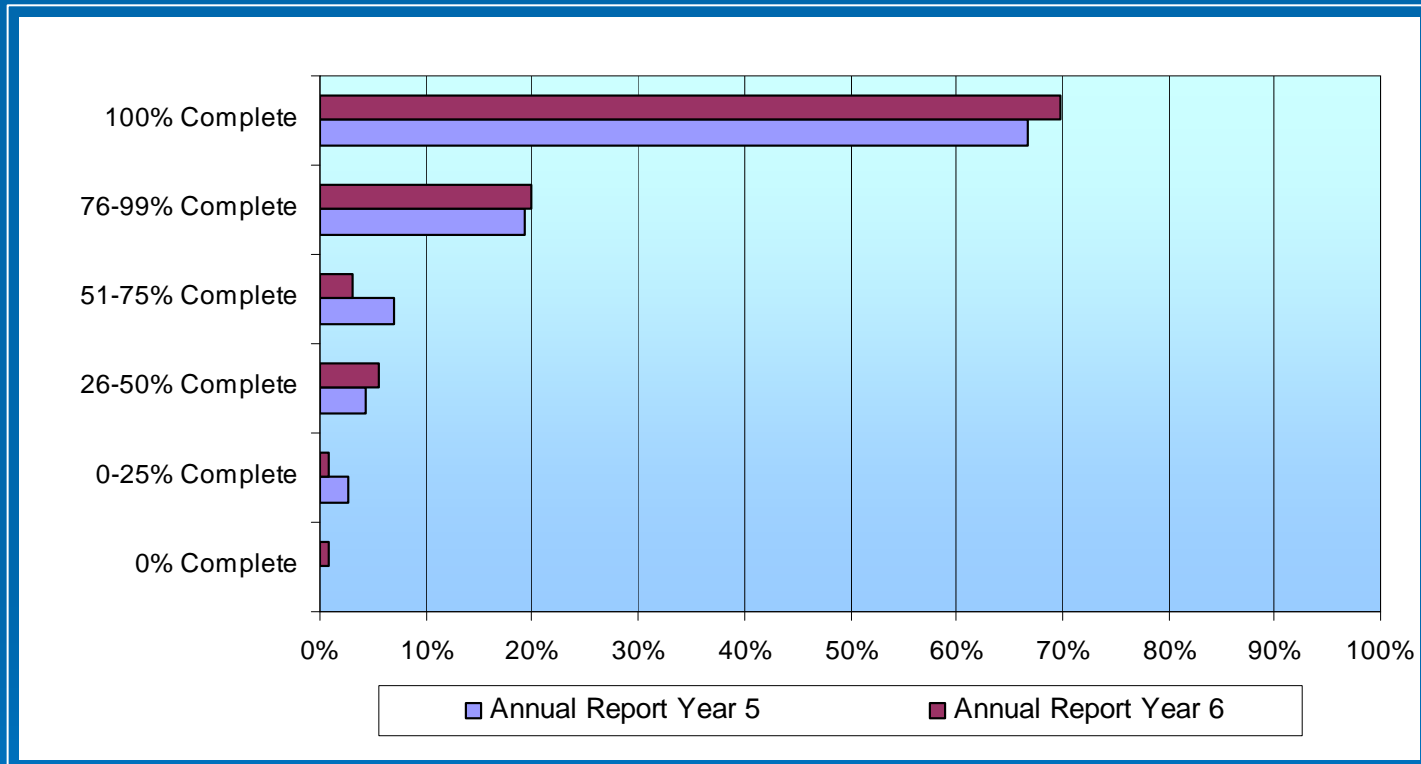
# MCM #2 - Public Participation & Involvement Reported Status of Practices Proposed in SWMP



# MCM #3 - Illicit Discharge Detection & Elimination Reported Status of Practices Proposed in SWMP



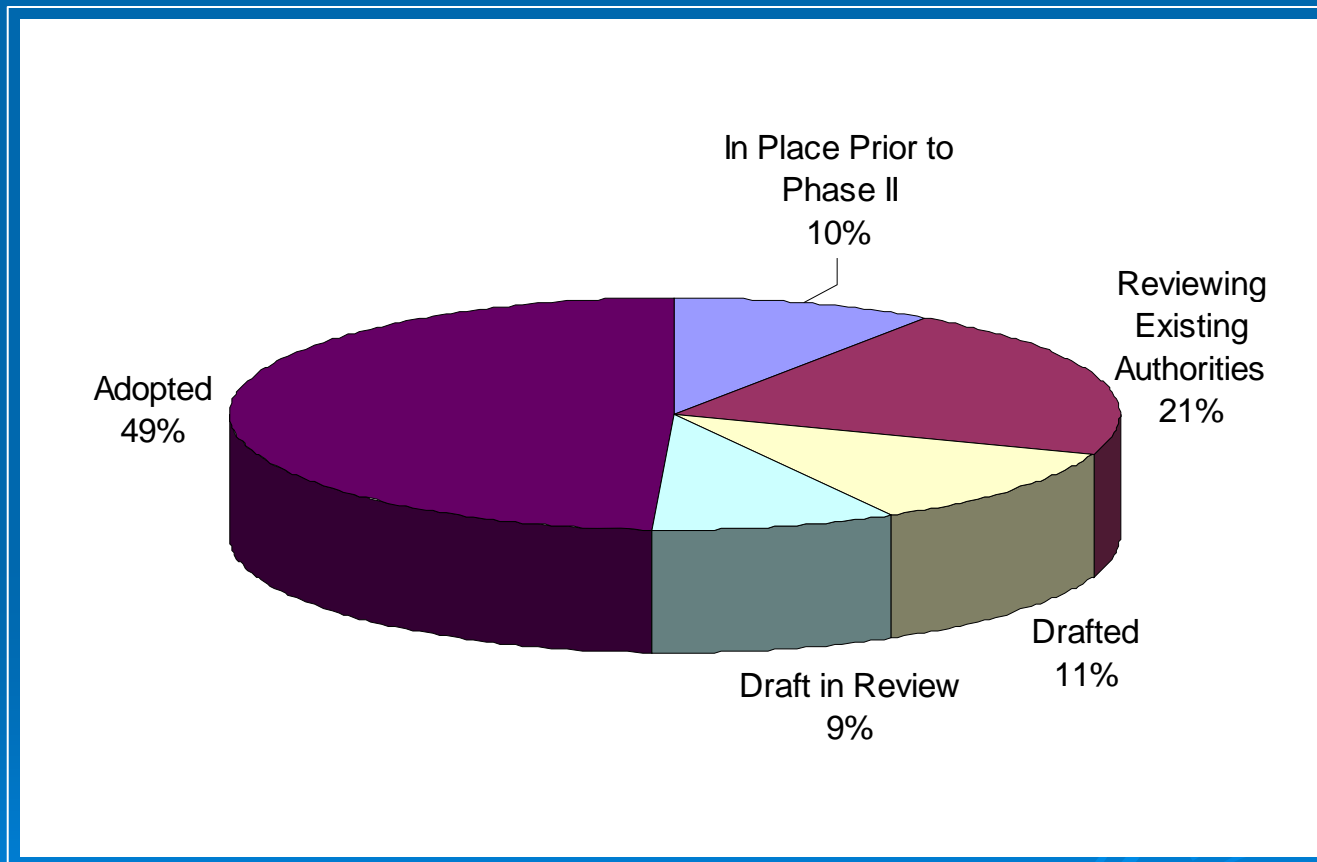
# Reported Status of Outfall Mapping (% Complete)\*



**\*Year 6: 77% reporting (125 of 164 annual reports)**

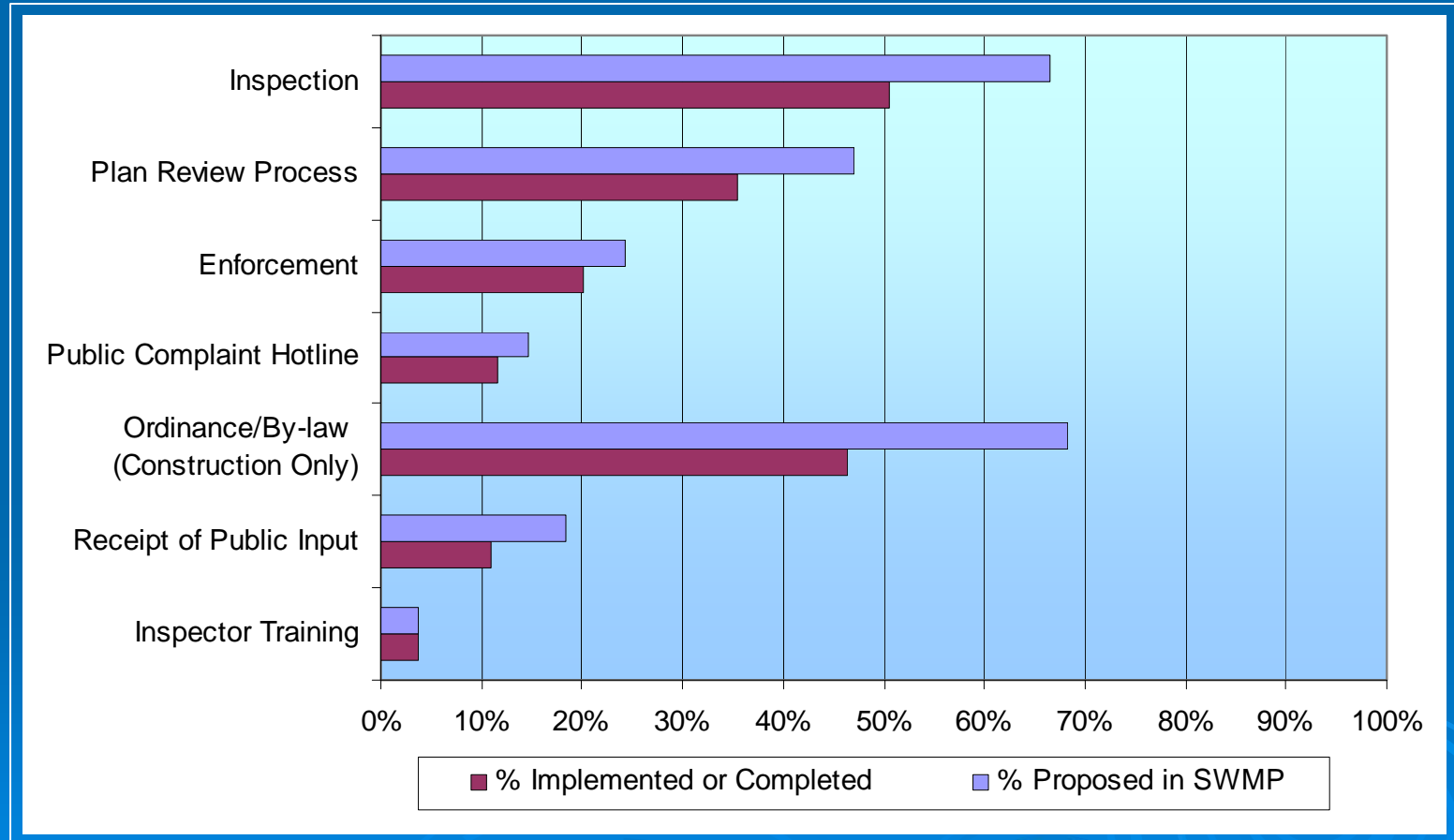
**Year 5: 73% reporting (114 of 156 annual reports)**

# Reported Regulatory Mechanism Status for IDDE\*

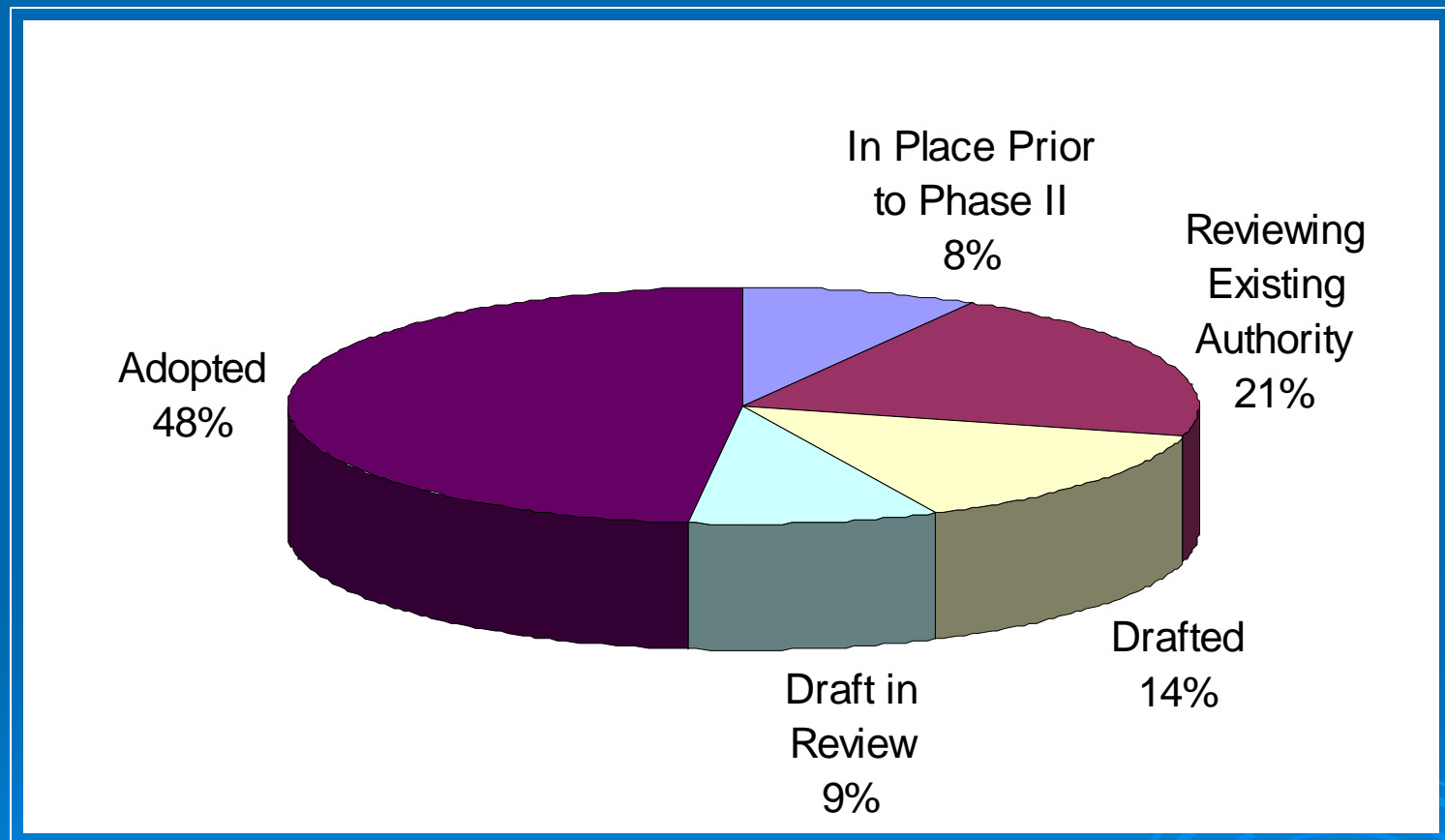


\* 96% reporting (157 of 164 year 6 annual reports)

# MCM #4 - Construction Site Runoff Control Reported Status of Practices Proposed in SWMP

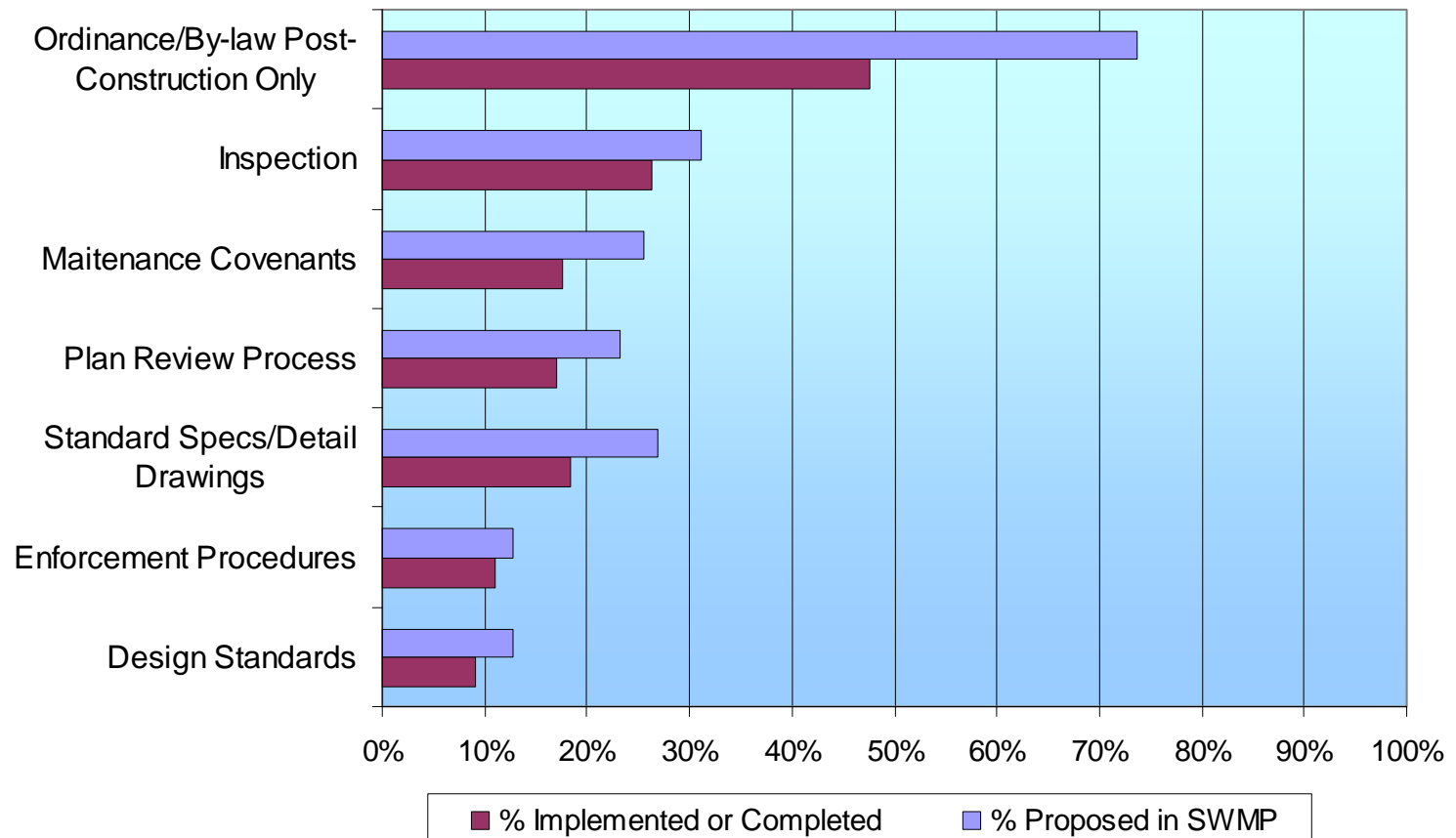


# Reported Regulatory Mechanism Status for Construction\*

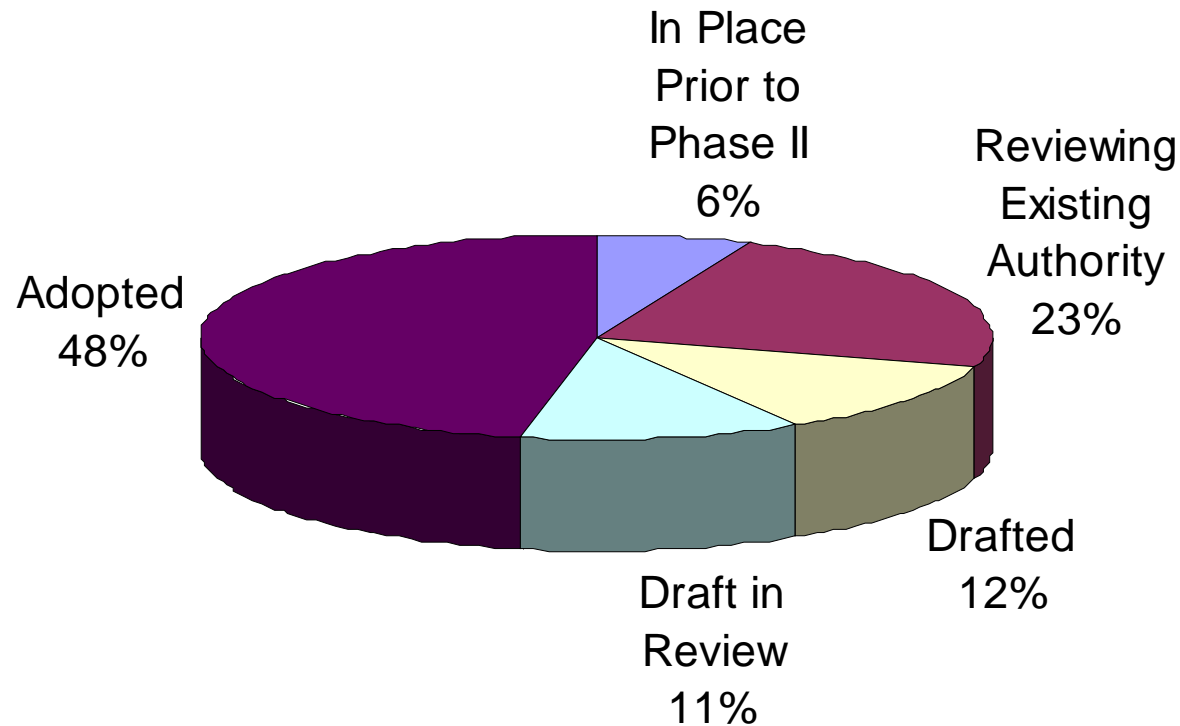


\* 96% reporting (158 of 164 year 6 annual reports)

# MCM #5 - Post-Development Runoff Control Reported Status of Practices Proposed in SWMP



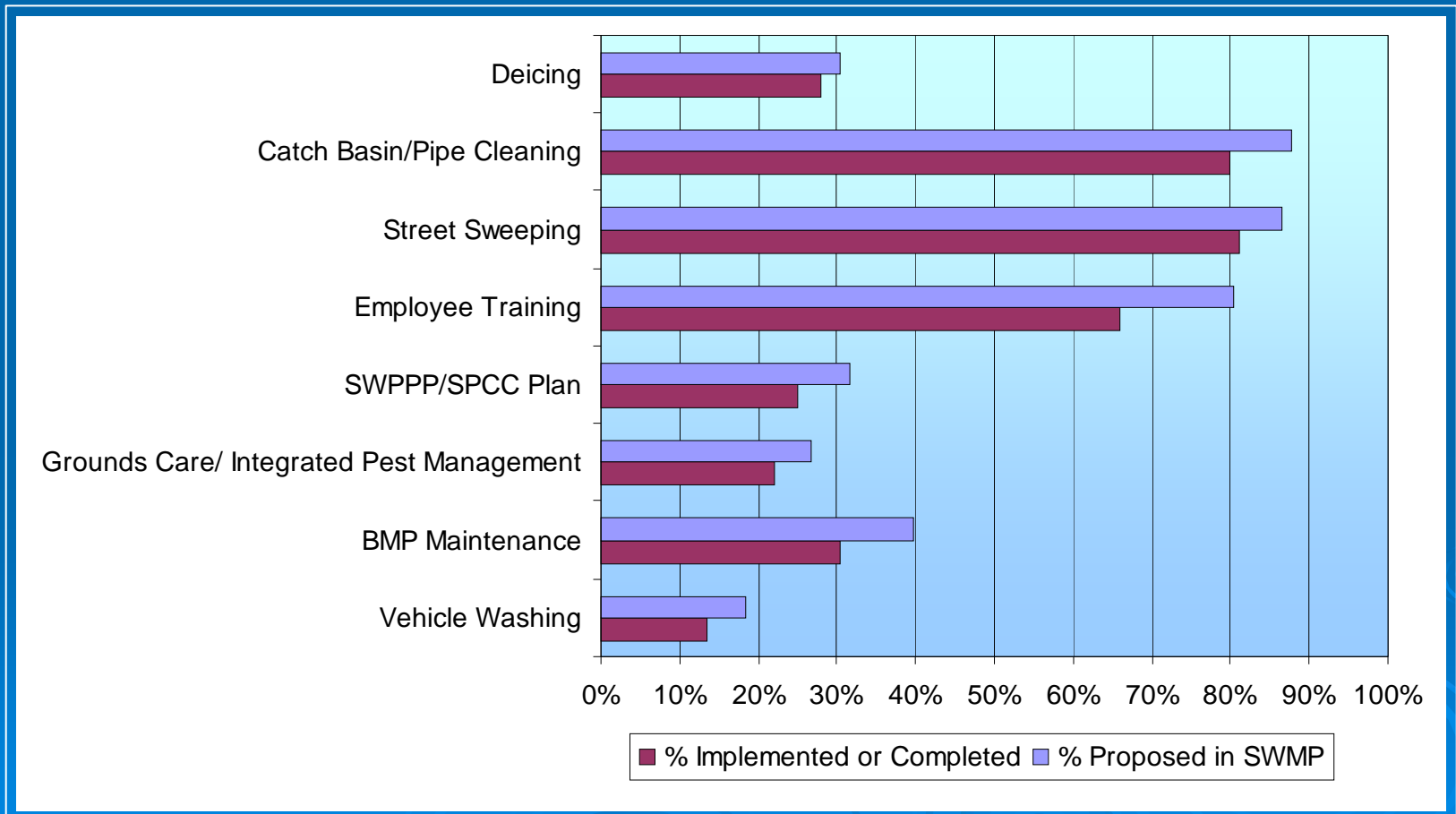
# Reported Regulatory Mechanism Status for Post-Development Runoff\*



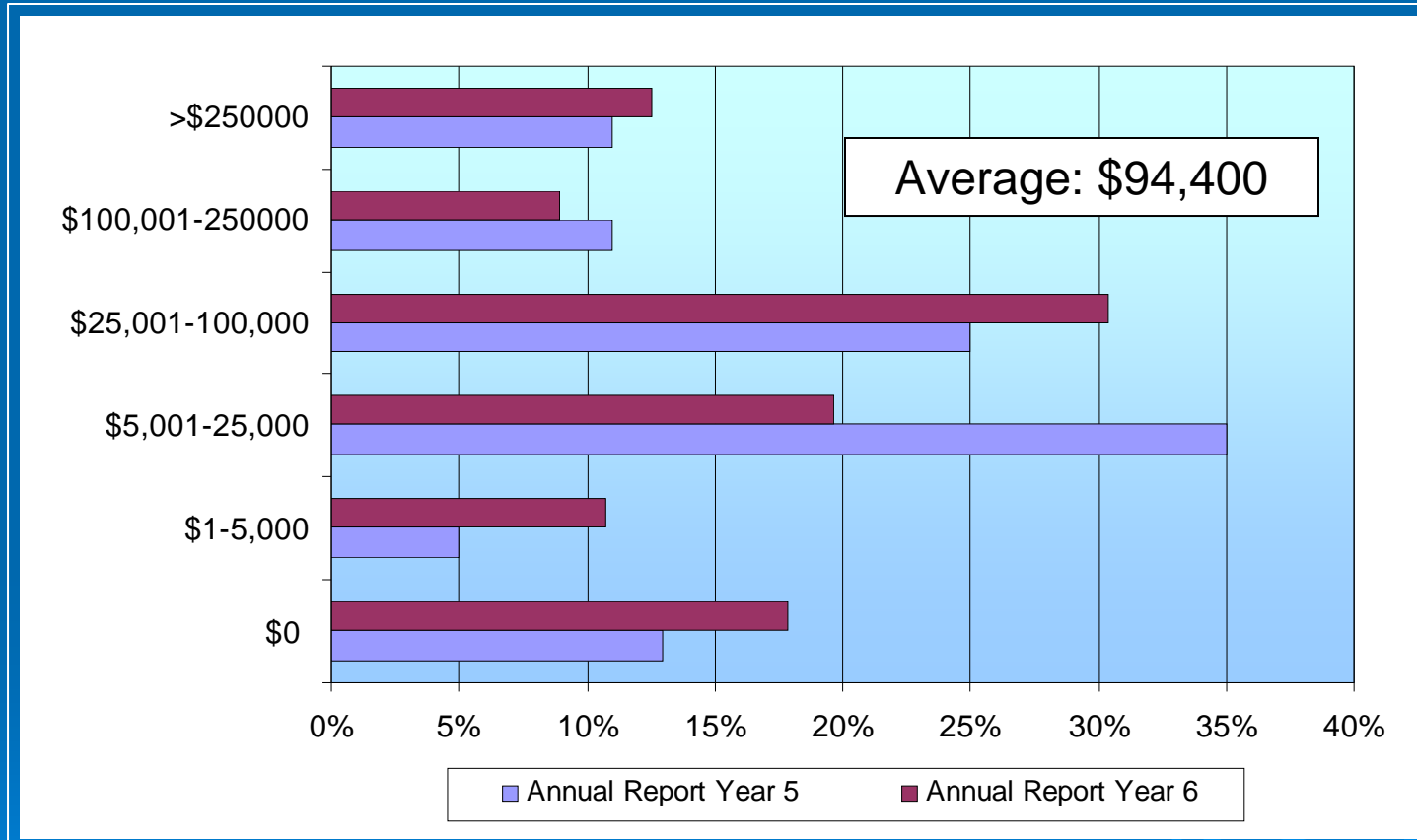
\* 97% reporting (159 of 164 year 6 annual reports)

# MCM #6 - Pollution Prevention and Good Housekeeping

## Reported Status of Practices Proposed in SWMP



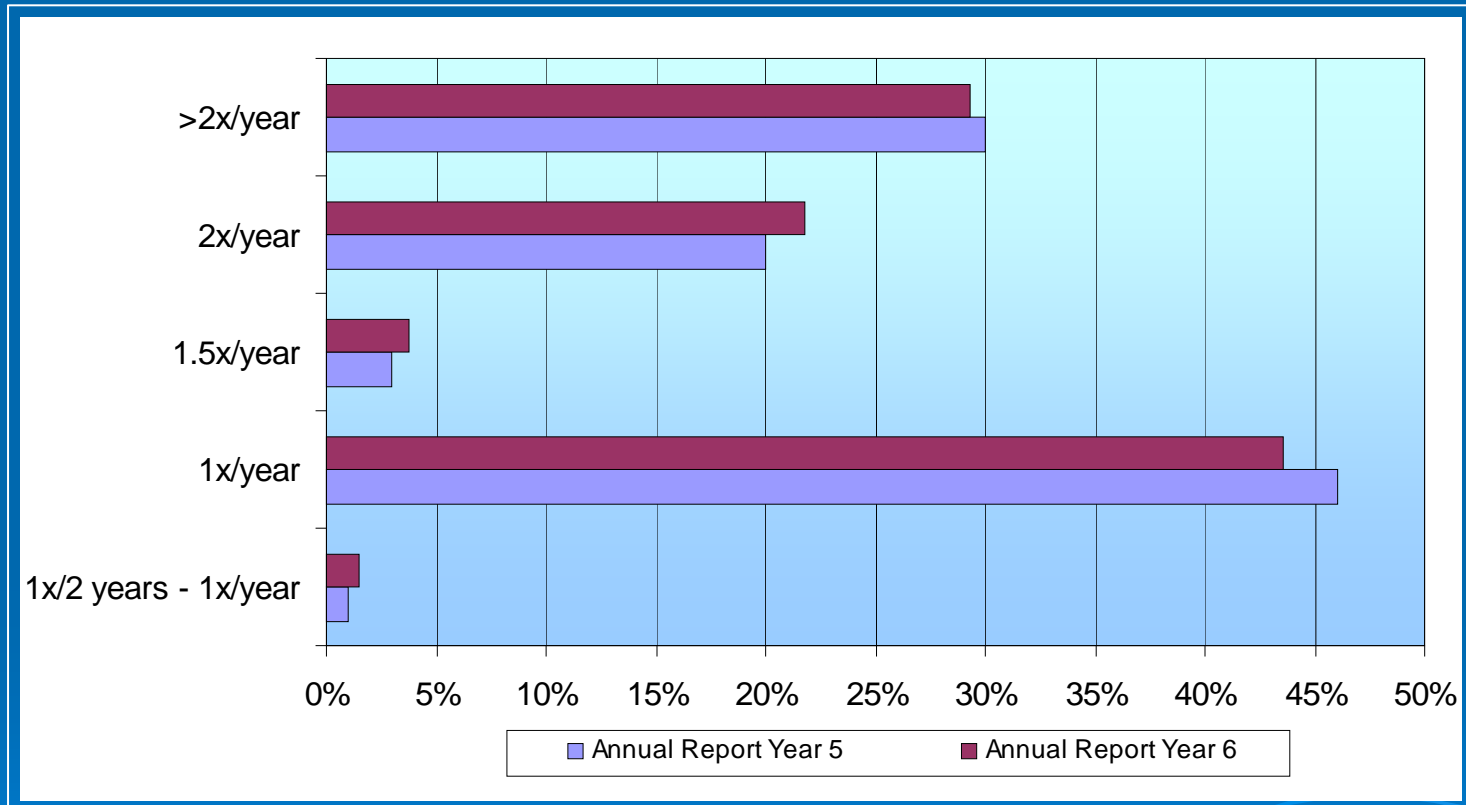
# Reported Annual Expenditures on Stormwater Management Program\*



**\*Year 6: 34% reporting (56 of 164 year 6 annual reports)**

**Year 5: 36% reporting (56 of 156 year 5 annual reports)**

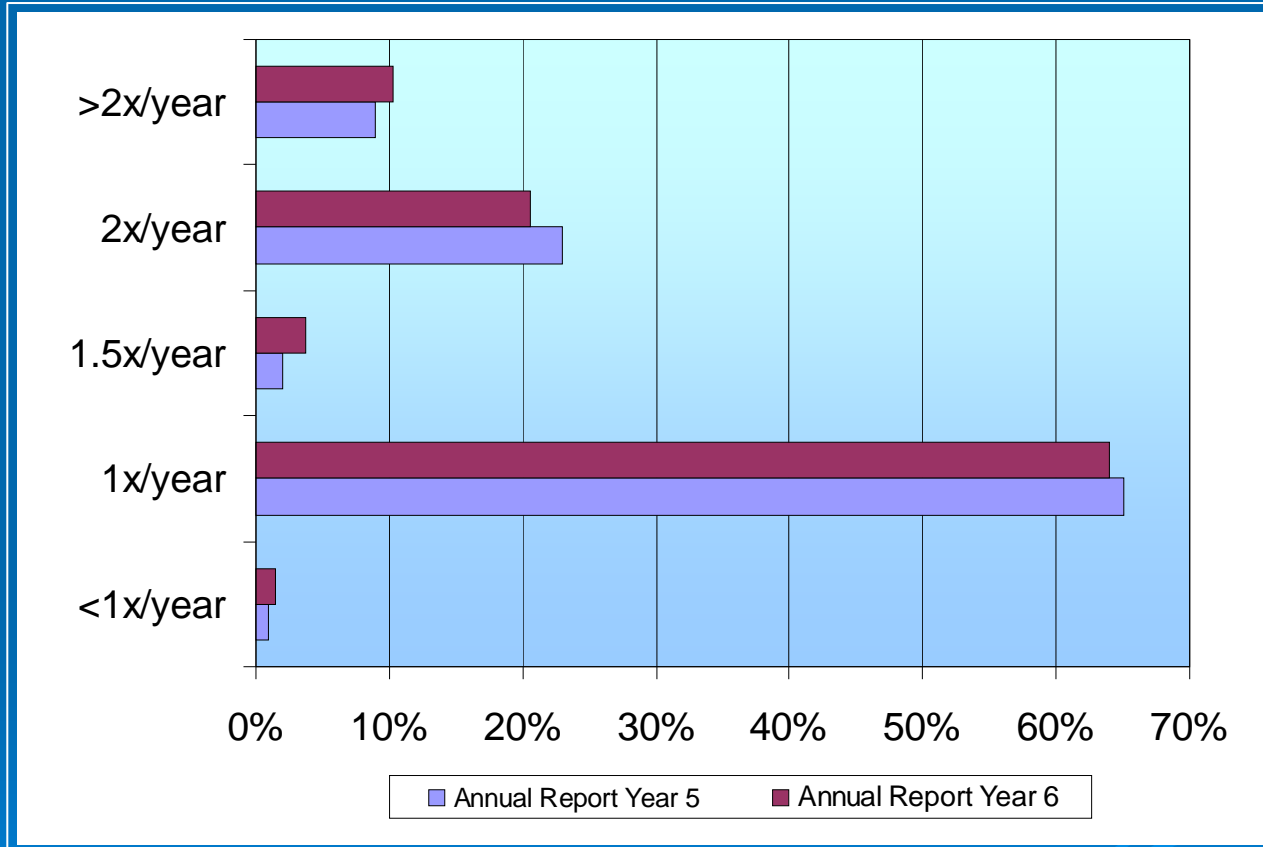
# Reported Frequency of Street Sweeping (Commercial/Arterial)\*



**\*Year 6: 81% reporting (133 of 164 year 6 annual reports)**

**Year 5: 81% reporting (126 of 156 year 5 annual reports)**

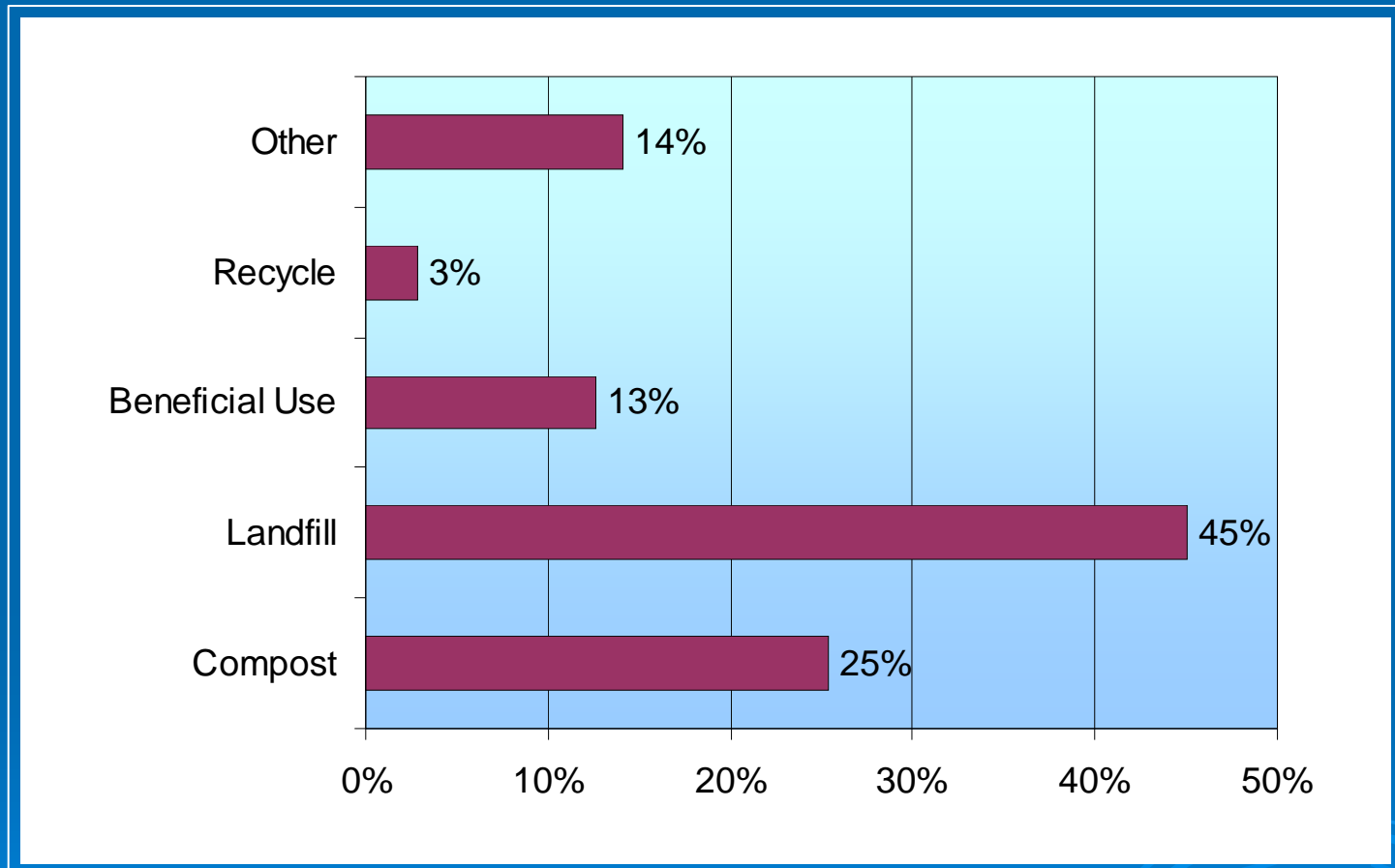
# Reported Frequency of Street Sweeping (Residential)\*



**\*Year 6: 83% reporting (136 of 164 year 6 annual reports)**

**Year 5: 85% reporting (133 of 156 year 5 annual reports)**

# Reported Street Sweepings Use & Disposal\*



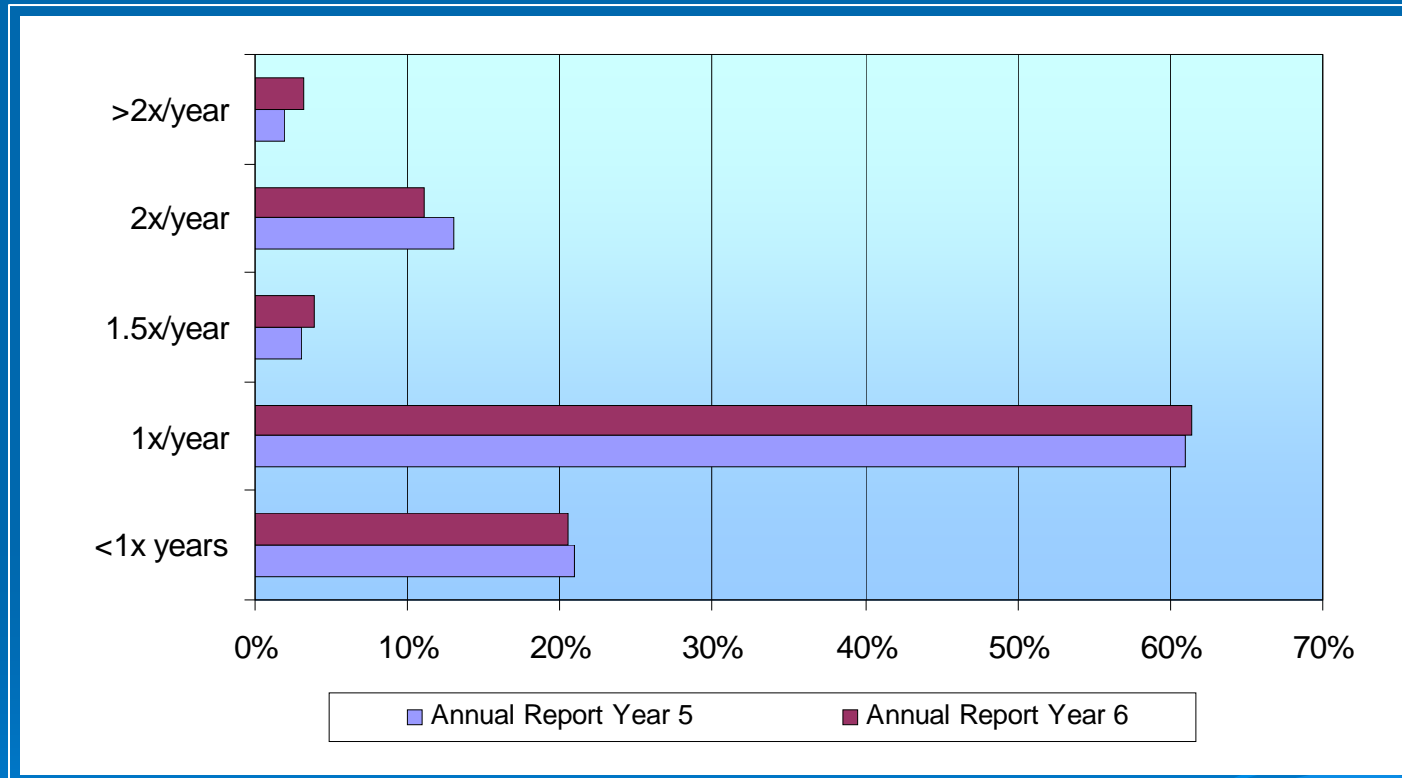
\* 43% reporting (71 of 164 year 6 annual reports)

# Metals Collected by Street Sweeping per year

	Qty. of sand/debris collected by sweeping (kg/year)	Ni (kg/year)	Cu (kg/year)	Zn (kg/year)	Cr (kg/year)	Pb (kg/year)	Cd (kg/year)
Minimum	20,000	1.67	2.69	8.35	0.581	3.12	0.0400
Maximum	5,440,000	501	806	2500	174	936	10.9
Average	960,000	88.3	142	441	30.7	165	1.90
Standard Deviation	1,120,000	103	166	517	35.9	193	2.25
Estimated total for all MA MS4s	228,000,000	21,000	33,800	105,000	7,310	39,300	452
<b>* 28% Reporting (46 out of 164 year 6 annual reports)</b>							

\*Based on data from “Metals and PAHs adsorbed to street particles,” a study at the University of California at Los Angeles (Lau, Strenstrom, 2005)

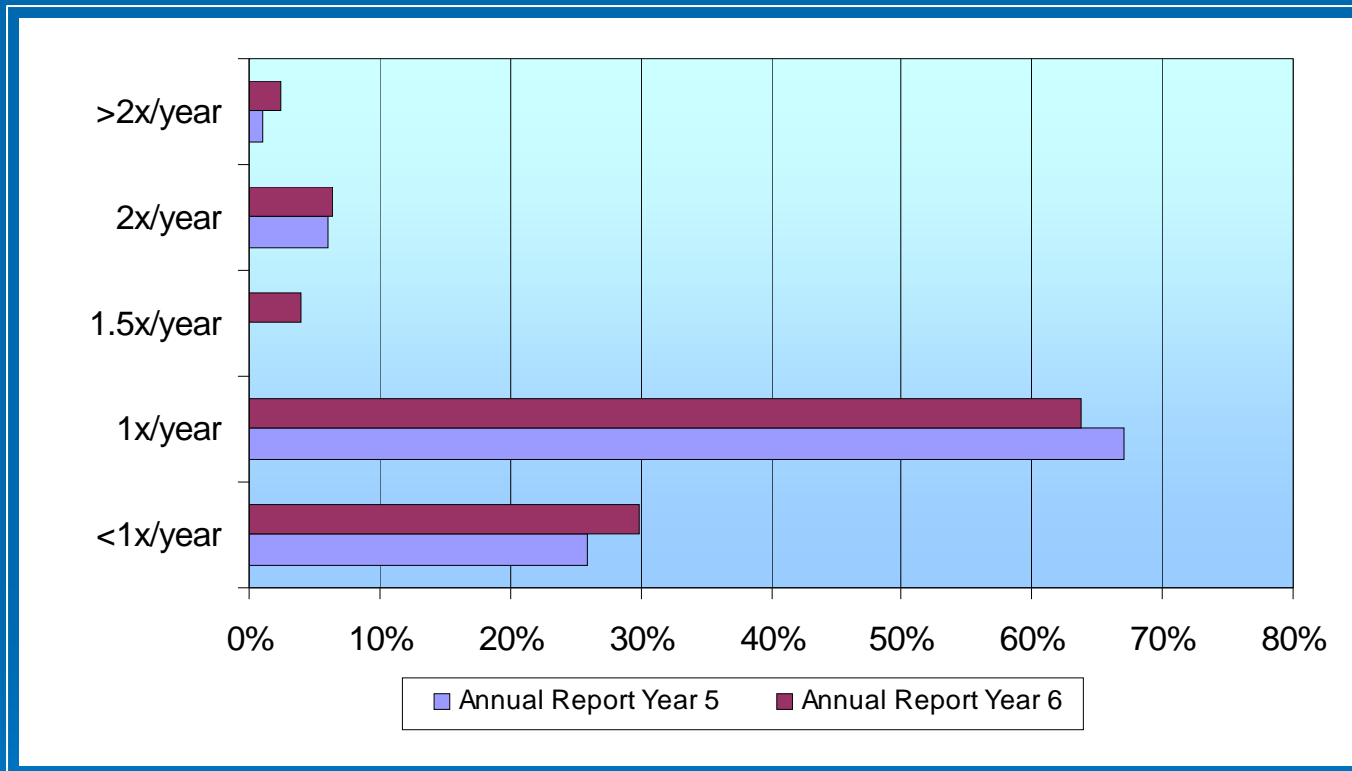
# Reported Frequency of Catch Basin Cleaning (Commercial/Arterial)\*



**\*Year 6: 77% reporting (127 of 164 year 6 annual reports)**

**Year 5: 75% reporting (117 of 156 year 5 annual reports)**

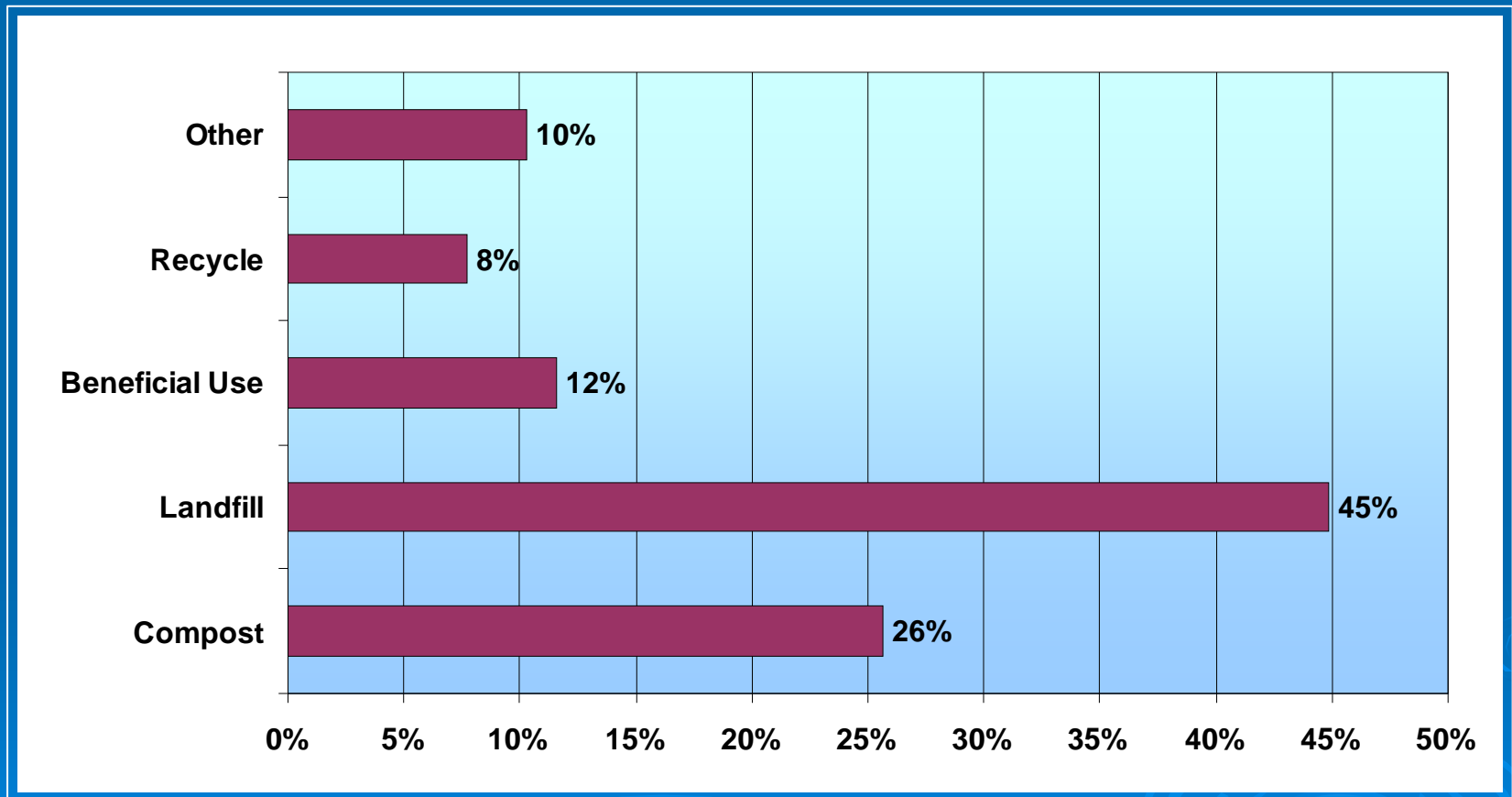
# Reported Frequency of Catch Basin Cleaning (Residential)\*



**\*Year 6: 76% reporting (124 of 164 year 6 annual reports)**

**Year 5: 72% reporting (113 of 156 year 5 annual reports)**

# Reported Catch Basin Screenings Use & Disposal\*



\* 48% reporting (78 of 164 year 6 annual reports)

# Chemical Quality of Catch Basin Sediment per year

	Total number of structures cleaned (per MS4 per year)	Area cleaned (ha)	Qty. of screenings/debris removed from catchbasins (kg total solids)	Accumulation of Total Solids (kg/ha/yr)
Minimum	25	17.9	3630	8.89
Maximum	3500	2500	2450000	6350
Average	1430	1020	616000	1090
Standard Deviation	1020	727	749000	1480
Estimated total for all MA MS4s	340,000	243,000	147,000,000	259,000
<b>21% Reporting (35 out of 164 year 6 annual reports)</b>				

\*Based on data from a study in Bellevue, WA (Pitt 1985) as part of the Nationwide Urban Runoff Program (EPA 1983).

# Chemical Quality of Catch Basin Sediment per year

	COD (kg/ha/yr)	TKN (kg/ha/yr)	TP (kg/ha/yr)	Pb (kg/ha/yr)	Zn (kg/ha/yr)
Minimum	1.60	8.89E-03	1.16E-02	1.78E-03	4.45E-03
Maximum	1140	6.35	8.26	1.27	3.18
Average	196	1.09	1.41	0.217	0.544
Standard Deviation	266	1.48	1.92	0.295	0.739
Estimated total for all MA MS4s	46,600	259	336	51.8	129
21% Reporting (35 out of 164 year 6 annual reports)					

\*Based on data from a study in Bellevue, WA (Pitt 1985) as part of the Nationwide Urban Runoff Program (EPA 1983).

# Reported Deicing Metrics

Method	% Utilizing Method	% Reporting
Automatic or Zero-velocity Spreaders used	50%	46%
Manual Control Spreaders used	83%	50%
Pre-wetting Techniques	54%	49%
Salt pile(s) covered in storage shed(s)	96%	63%

Salt to Sand Ratio	Year 6	Year 5	Year 4		
	1:1	1.2:1	1.1:1		
* salt to sand ratio neglects "other" deicing materials					
Average % of Deicing Material	Sand	NaCl	CaCl <sub>2</sub>	MgCl <sub>2</sub>	Other
	49.4	45.4	3.9	0.6	0.7
% Reporting	42.7%	(67 of 164 year 6 annual reports)			

# Select BMPs of Interest Reported by Municipalities

- Rain Garden Construction (5)
- Rain Barrel Promotion Sales to Residents(14)
- Use of alternative deicing products(13)
- Reforestation Programs (9)
- Phosphate-free Biodegradable Soap used for Vehicle Washing at Municipal Yards (2)
- LID Practices Permitted or Encouraged (22)
- 42 municipalities identified 296 illicit discharges and removed 49%
- Additionally, One community identified and removed 300+ illicit cross connections

# Potential Sources of Error

- Metric data is optional, and often is incomplete when it is submitted.
- Inconsistency between reported updates in Minimum Control Measure Practices and Metrics.
- Descriptions of updates can be vague and lack quantitative data.
- Incomplete Data Set (only two thirds of annual reports included in analysis to date)

# References

- Lau, Sim-Lin, and Michael K. Strenstrom. "Metals and PAHs Adsorbed to Street Particles." *Water Research* 39 (2005): 4083-092
- Pitt, Robert, and Shirley Clark. "Interactions between catchbasin and street cleaning in urban drainages and sediment transport in storm drainage systems." *Chapter 6, Best Management Practices (BMP) Technology Symposium: Current and Future Directions*, American Society of Civil Engineers (May 2006): 94-125