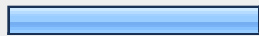

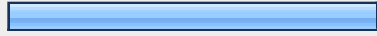




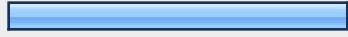
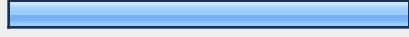
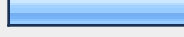



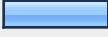


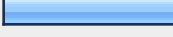
# Chesapeake Bay Stormwater Training Partnership Survey


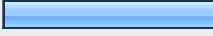
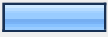


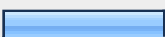
**1. Indicate in which state(s) most of your projects are primarily located. (Mark all that apply)**

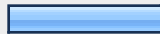
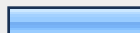
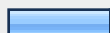

		Response Percent	Response Count
MD		38.8%	62
DC		9.4%	15
VA		<b>56.9%</b>	<b>91</b>
WV		3.8%	6
PA		5.6%	9
Other (please specify)		7.5%	12
		<i>answered question</i>	<b>160</b>
		<i>skipped question</i>	<b>0</b>

**2. Indicate the Chesapeake Bay physiographic region(s) where your projects are primarily located. (Mark all that apply)**

		Response Percent	Response Count
Appalachian Plateaus		6.3%	10
Coastal Plain		52.2%	83
<b>Piedmont</b>		<b>61.6%</b>	<b>98</b>
Valley and Ridge		27.0%	43
		<i>answered question</i>	<b>159</b>
		<i>skipped question</i>	<b>1</b>

<b>3. Indicate the sector where you work.</b>			
		<b>Response Percent</b>	<b>Response Count</b>
<b>Engineering and design consulting</b>		<b>36.7%</b>	<b>58</b>
Local government stormwater plan review		15.8%	25
Regulatory oversight (Federal or State)		10.1%	16
Environmental organization		11.4%	18
Other (please specify)		25.9%	41
		<b><i>answered question</i></b>	<b>158</b>
		<b><i>skipped question</i></b>	<b>2</b>

<b>4. What are you primarily responsible for in your stormwater management services role?</b>			
		<b>Response Percent</b>	<b>Response Count</b>
Management and oversight		20.9%	33
<b>Design</b>		<b>32.3%</b>	<b>51</b>
Plan review		15.2%	24
Inspection and maintenance		5.7%	9
Construction/Installation		1.3%	2
Other (please specify)		24.7%	39
		<b><i>answered question</i></b>	<b>158</b>
		<b><i>skipped question</i></b>	<b>2</b>

5. Indicate your stormwater management experience.			
		Response Percent	Response Count
0-2 years		23.4%	37
3-5 years		20.3%	32
6-10 years		15.2%	24
> 10 years		41.1%	65
	<i>answered question</i>		158
	<i>skipped question</i>		2

6. Rate your knowledge on the following topics (1 to 5 where 5 is the highest):						
	1 (Lowest)	2	3	4	5 (Highest)	Response Count
Design of low impact development practices	7.8% (12)	20.8% (32)	<b>29.9% (46)</b>	<b>29.9% (46)</b>	11.7% (18)	154
Design techniques for urban stream channel protection	17.5% (27)	24.7% (38)	<b>33.8% (52)</b>	18.2% (28)	5.8% (9)	154
Runoff volume reduction techniques	6.5% (10)	18.8% (29)	<b>32.5% (50)</b>	29.9% (46)	12.3% (19)	154
Low impact development credits for flood control	26.0% (40)	<b>35.7% (55)</b>	25.3% (39)	12.3% (19)	0.6% (1)	154
Nutrient removal for stormwater practices	10.4% (16)	18.8% (29)	<b>32.5% (50)</b>	28.6% (44)	9.7% (15)	154
Nonstructural stormwater practices (e.g., rooftop disconnection and grass channels) and credits for runoff	7.8% (12)	18.2% (28)	32.5% (50)	<b>33.1% (51)</b>	8.4% (13)	154
Your current state stormwater requirements	6.5% (10)	13.0% (20)	18.2% (28)	<b>40.3% (62)</b>	22.1% (34)	154
	<i>answered question</i>					154
	<i>skipped question</i>					6

7. In the last year, estimate the number of practices that you were responsible for implementing. If this does not apply

Practices implemented						
	0	1-2	3-4	5-6	7-10	
Infiltration	22.2% (14)	<b>36.5% (23)</b>	19.0% (12)	9.5% (6)	3.2% (2)	
Filtering practices	21.7% (13)	<b>33.3% (20)</b>	15.0% (9)	13.3% (8)	5.0% (3)	
Green roof	<b>67.2% (39)</b>	24.1% (14)	5.2% (3)	1.7% (1)	1.7% (1)	
Rainwater harvesting	<b>50.0% (30)</b>	38.3% (23)	3.3% (2)	3.3% (2)	0.0% (0)	
Permeable pavement	<b>44.6% (25)</b>	<b>44.6% (25)</b>	10.7% (6)	0.0% (0)	0.0% (0)	
Constructed wetland	<b>58.7% (37)</b>	28.6% (18)	4.8% (3)	1.6% (1)	1.6% (1)	
Bioretention	13.9% (10)	<b>40.3% (29)</b>	23.6% (17)	6.9% (5)	4.2% (3)	
Grass swale	22.6% (14)	<b>30.6% (19)</b>	24.2% (15)	6.5% (4)	6.5% (4)	
Impervious disconnection	<b>50.0% (29)</b>	25.9% (15)	10.3% (6)	5.2% (3)	1.7% (1)	
Filter strips	<b>47.3% (26)</b>	29.1% (16)	12.7% (7)	3.6% (2)	0.0% (0)	
Wet pond	<b>41.3% (26)</b>	27.0% (17)	19.0% (12)	6.3% (4)	1.6% (1)	
Amended soils	<b>64.9% (37)</b>	26.3% (15)	3.5% (2)	1.8% (1)	0.0% (0)	
Dry Swale	<b>46.4% (26)</b>	25.0% (14)	16.1% (9)	3.6% (2)	5.4% (3)	
Extended detention	31.3% (20)	<b>34.4% (22)</b>	15.6% (10)	7.8% (5)	3.1% (2)	
						Other (p
						<b>answe</b>
						<b>skip</b>


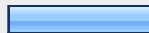


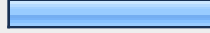
**8. For your last three projects that implemented the following practices, what was the typical drainage area to that practice? If you cannot answer, please skip ahead.**

**Drainage area per practice in acres**

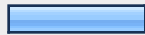

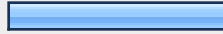

	<1	1-3	3-5	5-10	10-25
Infiltration	<b>47.9% (23)</b>	33.3% (16)	6.3% (3)	2.1% (1)	4.2% (2)
Filtering practices	<b>44.4% (20)</b>	33.3% (15)	4.4% (2)	8.9% (4)	2.2% (1)
Green roof	<b>78.3% (18)</b>	17.4% (4)	0.0% (0)	0.0% (0)	4.3% (1)
Rainwater harvesting	<b>78.6% (22)</b>	14.3% (4)	3.6% (1)	0.0% (0)	3.6% (1)
Permeable pavement	<b>54.8% (17)</b>	41.9% (13)	0.0% (0)	3.2% (1)	0.0% (0)
Constructed wetland	<b>26.9% (7)</b>	15.4% (4)	11.5% (3)	19.2% (5)	15.4% (4)
Bioretention	<b>48.4% (30)</b>	35.5% (22)	11.3% (7)	1.6% (1)	1.6% (1)
Grass swale	<b>58.1% (25)</b>	25.6% (11)	7.0% (3)	7.0% (3)	2.3% (1)
Impervious disconnection	<b>71.9% (23)</b>	15.6% (5)	6.3% (2)	6.3% (2)	0.0% (0)
Filter strips	<b>64.5% (20)</b>	16.1% (5)	6.5% (2)	9.7% (3)	0.0% (0)
Wet pond	11.1% (4)	13.9% (5)	11.1% (4)	19.4% (7)	<b>27.8% (10)</b>
Amended soils	<b>52.6% (10)</b>	21.1% (4)	5.3% (1)	21.1% (4)	0.0% (0)
Dry Swale	<b>46.7% (14)</b>	26.7% (8)	10.0% (3)	16.7% (5)	0.0% (0)
Extended detention	4.7% (2)	23.3% (10)	11.6% (5)	<b>34.9% (15)</b>	14.0% (6)
					Other (0)
					<b>answer</b>
					<b>skip</b>

9. Indicate the frequency that you use the following site design practices in a typical year for your projects.				
Frequency Used				
	Always	Sometimes	Never	Not applicable
Conduct environmental mapping at site prior to layout	<b>42.4% (56)</b>	27.3% (36)	6.1% (8)	24.2% (31)
Conserve existing trees and/or plant trees to increase canopy cover	38.0% (52)	<b>43.8% (60)</b>	1.5% (2)	16.8% (22)
Conserve natural areas (e.g., forests, wetlands, steep slopes, floodplains)	<b>49.3% (69)</b>	33.6% (47)	1.4% (2)	15.7% (21)
Redesign site to reduce impervious cover (limit street width, etc.)	19.1% (25)	<b>46.6% (61)</b>	6.1% (8)	28.2% (37)
Fingerprint building layout to reduce clearing and grading at site	20.6% (26)	<b>34.9% (44)</b>	9.5% (12)	<b>34.9% (44)</b>
Integrate erosion and sediment control practices and stormwater management practices	<b>59.0% (82)</b>	24.5% (34)	0.7% (1)	15.8% (21)
Maintain natural flow paths across the site	23.9% (32)	<b>56.7% (76)</b>	3.0% (4)	16.4% (22)
Minimize disturbance of permeable soils	23.5% (32)	<b>50.7% (69)</b>	8.8% (12)	16.9% (22)
Reserve stream, wetland, and shoreline buffers	<b>55.2% (74)</b>	21.6% (29)	1.5% (2)	21.6% (28)
Use open channel drainage systems instead of curb and gutter	11.4% (15)	<b>61.4% (81)</b>	2.3% (3)	25.0% (33)
				Other (please specify)
				<b>answered question</b>
				<b>skipped question</b>

10. What are the top three obstacles you have encountered in using low impact design?					
	Biggest Obstacle	Second Biggest Obstacle	Third Biggest Obstacle	Rating Average	Response Count
Local code prohibits practice	<b>50.0% (8)</b>	37.5% (6)	12.5% (2)	2.38	16
Local code does not prohibit practice but presents barriers	<b>39.3% (22)</b>	35.7% (20)	25.0% (14)	2.14	56
No stormwater credit available	<b>44.0% (11)</b>	32.0% (8)	24.0% (6)	2.20	25
Maintenance concerns	24.1% (19)	31.6% (25)	<b>44.3% (35)</b>	1.80	79
Lack of familiarity (design guidance, performance, and/or review)	35.3% (24)	<b>39.7% (27)</b>	25.0% (17)	2.10	68
Lack of construction guidance or difficult to build	28.6% (8)	<b>35.7% (10)</b>	<b>35.7% (10)</b>	1.93	28
Public acceptance	34.0% (17)	24.0% (12)	<b>42.0% (21)</b>	1.92	50
High cost of practices	<b>37.3% (19)</b>	31.4% (16)	31.4% (16)	2.06	51
Other (please specify)					22
<b>answered question</b>					<b>132</b>
<b>skipped question</b>					<b>28</b>


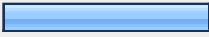
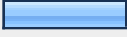
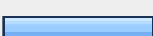
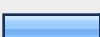
11. What is the average annual phosphorus load from a one acre parking lot?			
		Response Percent	Response Count
0.02 pounds per yr		3.6%	5
0.6 pounds per yr		21.6%	30
<b>2.0 pounds per yr</b>		<b>34.5%</b>	<b>48</b>
10 pounds per yr		9.4%	13
No idea		30.9%	43
<b>answered question</b>			<b>139</b>
<b>skipped question</b>			<b>21</b>

**12. Which of the following scenarios results in the greatest overall mass pollutant removal in a stormwater practice?**




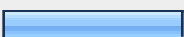
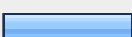

		Response Percent	Response Count
Practice that reduces the runoff event mean concentration (mg/L) by 25% (via settling, filtering, biological uptake, etc.), but does not reduce runoff volume		20.9%	29
Dilithium crystals		0.0%	0
Practice that reduces the total mass load by 40%		25.9%	36
<b>Practice that reduces runoff volume by 50%, but does not reduce the runoff event mean concentration</b>		<b>33.1%</b>	<b>46</b>
No idea		20.1%	28
		<i>answered question</i>	<b>139</b>
		<i>skipped question</i>	<b>21</b>



**13. Which of the following options would not generally improve the overall performance (nutrient removal) of a bioretention facility?**



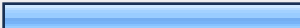
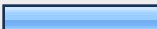

		Response Percent	Response Count
Increasing depth of gravel sump layer below underdrain		12.2%	17
<b>Increase the depth of ponding above the filter bed</b>		<b>31.7%</b>	<b>44</b>
Increasing the organic content of the filter media		18.7%	26
Decreasing the collection efficiency of the underdrain system		23.0%	32
No idea		14.4%	20
		<i>answered question</i>	<b>139</b>
		<i>skipped question</i>	<b>21</b>


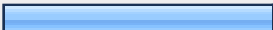
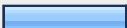


**14. In 2005, urban stormwater runoff contributed what percentage of the total annual nitrogen load delivered to the Chesapeake Bay from all sources.**





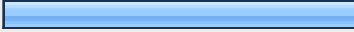
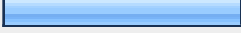
		Response Percent	Response Count
2%		0.7%	1
12%		7.2%	10
20%		26.6%	37
<b>40%</b>		<b>27.3%</b>	<b>38</b>
60%		19.4%	27
No idea		18.7%	26
		<i>answered question</i>	<b>139</b>
		<i>skipped question</i>	<b>21</b>

15. Which of the following practices has the lowest annual runoff reduction rate?			
		Response Percent	Response Count
Bioretention		7.9%	11
Permeable pavers		21.6%	30
<b>Grass channels</b>		<b>30.9%</b>	<b>43</b>
Grass dry swale		12.2%	17
Green roof		12.9%	18
No idea		14.4%	20
		<i>answered question</i>	<b>139</b>
		<i>skipped question</i>	<b>21</b>

16. Which day of the week is the most convenient for you to attend trainings? (Mark all that apply)			
		Response Percent	Response Count
Monday		31.9%	43
Tuesday		57.0%	77
<b>Wednesday</b>		<b>61.5%</b>	<b>83</b>
Thursday		51.9%	70
Friday		36.3%	49
Other (please specify)		12.6%	17
		<i>answered question</i>	<b>135</b>
		<i>skipped question</i>	<b>25</b>

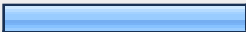


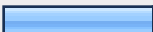
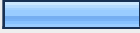
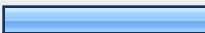
17. How many miles would you travel for a training workshop?			Response Percent	Response Count
Up to 10			6.7%	9
Up to 20			13.3%	18
<b>Up to 50</b>			<b>45.9%</b>	<b>62</b>
Up to 100			23.7%	32
Greater than 100			10.4%	14
			<i>answered question</i>	<b>135</b>
			<i>skipped question</i>	<b>25</b>

18. What is the opportunity cost for your company to attend training?			Response Percent	Response Count
\$0-20 per hour			24.4%	33
<b>\$21-50 per hour</b>			<b>41.5%</b>	<b>56</b>
\$51-100 per hour			18.5%	25
\$101-150 per hour			11.9%	16
\$>150 per hour			3.7%	5
			Other (please specify)	19
			<i>answered question</i>	<b>135</b>
			<i>skipped question</i>	<b>25</b>

19. What kind of stormwater training opportunities do you prefer? Mark the top three.				
			Response Percent	Response Count
Classroom training		57.5%	77	
Online/correspondence course		53.7%	72	
Read design manual and/or guidance documents		29.1%	39	
Multi-day intensive training		39.6%	53	
Webcast – live or archived		54.5%	73	
Learn from a colleague or mentor		36.6%	49	
Other (please specify)			6	
			<b>answered question</b>	<b>134</b>
			<b>skipped question</b>	<b>26</b>

20. Did you participate in any stormwater training in the last year?				
Yes/No	Yes	No	Response Count	
Classroom training	48.9% (66)	51.1% (69)	135	
Online/correspondence course	17.8% (24)	82.2% (111)	135	
Read design manual and/or guidance documents	76.3% (103)	23.7% (32)	135	
Multi-day intensive training	22.2% (30)	77.8% (105)	135	
Webcast – live or archived	51.1% (69)	48.9% (66)	135	
Other (please specify)			11	
			<b>answered question</b>	<b>135</b>
			<b>skipped question</b>	<b>25</b>

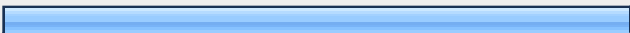
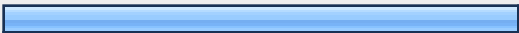
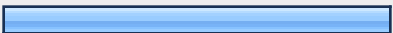

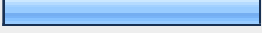



21. If you did not attend any trainings last year (answered "No" to all choices in the previous question), what prevented you?

		Response Percent	Response Count
Could not afford fees		37.5%	18
Too busy		31.3%	15
Travel time too costly		10.4%	5
No approval from management and/or supervisor		22.9%	11
New regulations were not in effect, so didn't need training yet		20.8%	10
Other (please specify)		31.3%	15
		<b><i>answered question</i></b>	<b>48</b>
		<b><i>skipped question</i></b>	<b>112</b>

22. Mark the top five stormwater topics you want to learn about in the next year.

		Response Percent	Response Count
Explanation of how your the new state stormwater regulations actually work		52.7%	68
Spreadsheet modeling tools to verify site compliance		30.2%	39
New stormwater hydrology methods		45.7%	59
Better site design		45.0%	58
Maintenance and inspection considerations		34.1%	44
Rainwater harvesting practices		26.4%	34
Permeable pavement		16.3%	21
Green roof		10.1%	13
Soil restoration		21.7%	28
Constructed wetland		18.6%	24
Filter strips		3.1%	4
Bioretention		26.4%	34
Sand filters		3.9%	5
Disconnecting impervious cover and other credits		13.2%	17
Stormwater infiltration and groundwater protection		24.8%	32
Stormwater design for redevelopment in urban watersheds		48.1%	62
Stormwater design for karst and coastal plain		24.8%	32
Stormwater retrofits		40.3%	52
Other (please specify)			6

	<i>answered question</i>	129
	<i>skipped question</i>	31

23. Why are you enrolling in the Training Partnership? (Mark all that apply)			Response Percent	Response Count
Improve overall knowledge of stormwater practices (design, construction, and maintenance)		97.0%	128	
Improve overall knowledge of stormwater regulations and permit criteria		79.5%	105	
Network with stormwater practitioners		59.8%	79	
Continuing Education credits		33.3%	44	
Train my employees and/or colleagues		39.4%	52	
Desire to improve the Chesapeake Bay quality		75.0%	99	
Improve knowledge of integrating stormwater management with land-use planning		75.8%	100	
Other (please specify)		6.1%	8	
	<i>answered question</i>	<b>132</b>		
	<i>skipped question</i>	<b>28</b>		

24. Provide additional comments and/or questions in the space provided.			Response Count
			11
	<i>answered question</i>	<b>11</b>	
	<i>skipped question</i>	<b>149</b>	