

# Survey of Stormwater Managers in Utah

## Report to the Utah Stormwater Advisory Committee

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**Utah Stormwater**  
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## Executive Summary

In 2014, the Utah Stormwater Advisory Committee (USWAC) sponsored a survey of stormwater managers throughout Utah. The survey effort corresponded with two types of stormwater managers: those operating under the municipal separate storm sewer systems permit (MS4), and those operating under construction or industrial discharge permits. The surveys were administered online using the Utah State University license of Qualtrics. The surveys addressed many topics, including the presence of low impact development infrastructure, use of private consultants, topics that were important to stormwater programs, and the extent of challenges that stormwater programs faced.

The MS4 manager survey received 96 survey responses (68% of those invited to participate) that represented 67 of the 72 (93%) municipal stormwater programs in Utah (not including the 14 municipal programs that were brought on early in 2014). For the construction and industrial survey, we received 53 responses (15% response rate); 38 from industry representatives and 15 from the construction sector.

The municipal survey findings found that, in terms of stormwater infrastructure, detention and retention basins were present in every responding municipality. Municipalities used native plants and bioswales at high rates as well. Almost all municipalities use visual water monitoring techniques, and almost half also used grab sampling techniques to assess water quality.

Respondents indicated high rates of interaction with other municipal stormwater program representatives. Municipalities collaborate most regularly on public education efforts and on educating developers and contractors. Over three-quarters of municipal stormwater programs consult with private firms in some capacity. The most common activity for which consultants were hired was for designing city-owned stormwater infrastructure.

Stormwater program responses indicated that the greatest challenge that they face is keeping up with required paperwork. Municipal stormwater programs also indicated that increasing public understanding of stormwater management and reducing the chances of flooding were of the greatest importance for their programs. Managers noted that the most useful sources of stormwater information were conversations with other stormwater coalition members.

Construction and industrial programs exhibited lower rates of challenges experienced within their programs compared to responses from the municipal programs. The greatest challenge that construction and industrial stormwater programs face is staying informed on stormwater regulations and policies. Two-thirds of the managers indicated that their construction or industrial program uses private consultants in some capacity. The most important aspect of stormwater management to construction and industrial programs was complying with state and federal laws. The second-most important area for these programs was being a good environmental steward.

## Background

In February and March 2014, Andrea Armstrong, graduate student at Utah State University, in partnership with USWAC leadership, conducted a survey of stormwater managers in municipalities as well as those in the construction and industrial sectors. The funds to support this research were provided by USWAC and the iUTAH EPSCoR project.

The goals of the survey were the following:

1. To learn from the experiences of different stormwater permittees throughout Utah.
2. To identify the areas of stormwater management where regulated entities are succeeding and are satisfied.
3. To identify the areas of stormwater management that are particularly difficult.
4. To access managers' thoughts and behaviors surrounding stormwater management regulations and other topics.
5. To establish a baseline and data collection protocol for future information gathering efforts.

## The survey procedure

All surveys were conducted online using the Utah State University license of the Qualtrics online program. Municipal managers were identified from the UPDES primary contact, and from information on stormwater program websites. All municipal stormwater managers who were identified were invited to participate. The municipal stormwater manager survey began on February 28<sup>th</sup> and concluded in mid-March. There were four email invitations sent to municipal managers. Those who did not complete the online survey were also mailed a hardcopy of the survey, with a postage paid envelope. In total, we received 96 survey responses (68% of those invited to participate) that represented 67 of the 72 (93%) municipal stormwater programs in Utah (not including the 14 municipal programs that were brought on early in 2014). Because some municipalities had more than one person respond to the survey, most of the responses reported herein are aggregated to the city-level, meaning that the information takes into account multiple responses from within the municipality, where appropriate. Responses that reflect individual views are indicated as such.

Within these Utah municipalities, the average length of time that respondents had worked in their current position was 19 years. On average, respondents had worked in stormwater management or engineering for 21 years. The respondents indicated that before they had entered their current position, they were, on average, 'a little familiar' to 'moderately familiar' with stormwater management or engineering.

The construction and industrial sector survey was conducted in March 2014. Those who received invitations to complete this survey were the primary contacts on the state permittee list. Construction and industrial representatives were randomly selected for participation (200 of each type of manager; 400 total). In sum, we received 53 responses (15% response rate); 38 from industry representatives and 15 from the construction sector. Only one response was received for each of the companies that responded to the survey.

Stormwater managers in the construction and industry sectors had, on average, worked in their current stormwater management capacity for almost seven years (mean = 6.57). On average, the respondents have worked in stormwater management for a little over nine years total (mean = 9.25). Prior to their current position, construction and industrial managers were 'a little familiar' with stormwater management (mean = 2.19).

## Findings: Municipal stormwater manager survey

### *Stormwater Management Plans (SWMPs)*

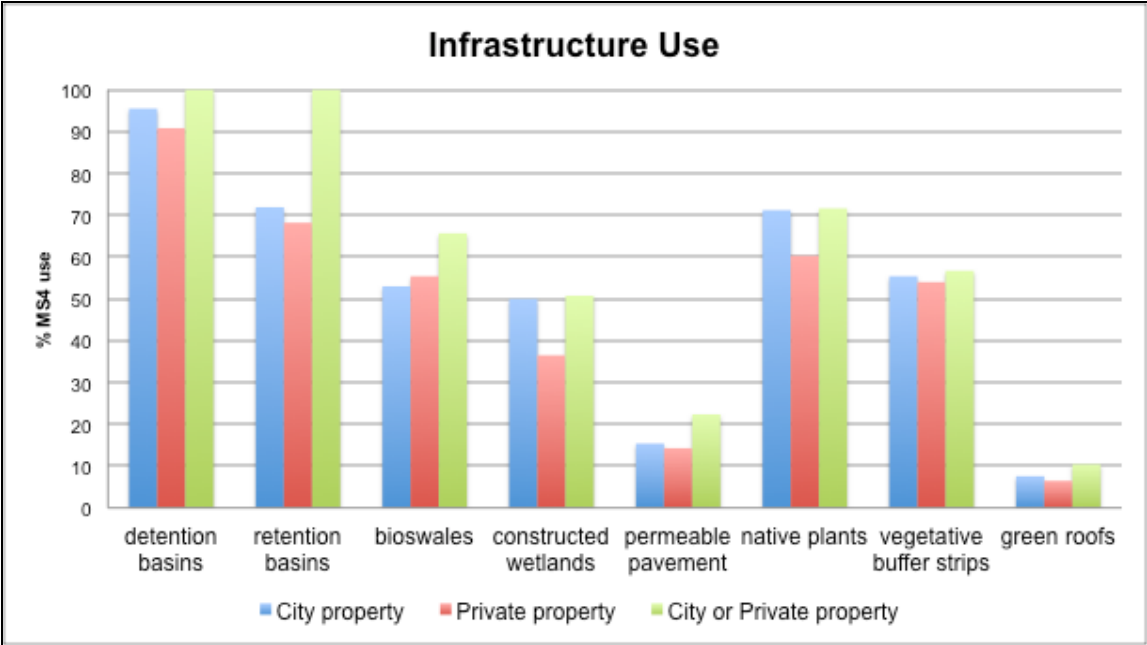
Fifty-eight out of the sixty-seven (87%) responding Utah municipalities had updated their Stormwater Management Program (SWMP) in the last four years (since 2010). The reasons for SWMP changes are summarized in Table 1. For municipalities that had updated their SWMPs, the most important reason that was considered while making the SWMP updates was that the changes brought programs up to date with permit requirements (almost 80% of cities indicated this was a ‘major’ or ‘the most important reason’ for changing their SWMP documents). The second most prominent consideration in changing SWMP documents was that the changes could reduce contaminants in runoff or site discharges (54% indicated this was a ‘major’ or ‘the most important reason’ for changing their SWMP documents).

Table 1. Reasons for SWMP changes.

How strong of a reason were the items listed below in the changes made to your municipality’s SWMP?	A major reason (%)	The most important reason (%)	Combined ‘major’ and ‘most important’ reasons (%)
The changes to our SWMP...			
...brought our program up to date with our permit requirements	33.9	44.6	78.5
...could reduce contaminants in runoff or site discharges	35.2	18.5	53.7
...included policies or procedures being used by stormwater programs similar to ours	40.0	1.8	41.8
...were recommended by members of our stormwater coalition	29.6	5.6	35.2
...were encouraged by a professional organization (e.g. USWAC)	30.9	3.6	34.5
...were recommended by a stormwater consultant	29.1	3.6	32.7
...let us address a number of environmental challenges	25.9	3.7	29.6
...reflected changes that we believe will be made to our permit in the near future	23.6	5.5	29.1
...brought our stormwater program in-line with programs similar to ours	23.6	5.5	29.1
...reflected updated engineering practices or technical guidelines	27.3	1.8	29.1
...could buffer our system during big storm events	18.5	9.3	27.8
...addressed concerns about possible future flooding	12.7	10.9	23.6

*Stormwater infrastructure*

There are many forms of stormwater infrastructure that may be used in a variety of landscape or development contexts. We assessed the percent of municipalities that used stormwater infrastructure, including detention or retention basins and six 'low impact development' infrastructure practices (Figure 1). Detention and retention basins were present in every responding municipality. Over sixty percent of municipalities used native plants and bioswales, while vegetative buffer strips and constructed wetlands were present in just over half of municipalities. At far lower rates, permeable pavement (~20%) and green roofs (~10%) were present on city or private properties.



**Figure 1.** Infrastructure use within Utah municipalities.

In terms of infrastructure maintenance, the city or county governments maintained detention and retention basins in ninety percent of the responding municipalities, while homeowners associations (HOAs) and private landowners (not HOAs) also were responsible for maintenance in seventy-seven and seventy-three percent of the municipalities, respectively. Similarly, commercial businesses were responsible for basin maintenance in seventy-three percent of the municipalities. Ninety-one percent of municipalities maintain a map or list of stormwater retention or detention basins in their jurisdiction. Six percent of cities do not keep a map or list.

## Monitoring and flooding

Almost all municipalities (97%) use visual water monitoring techniques (such as checking to see if there is cloudy or muddy discharge). Nearly half (48%) of municipalities also used grab sampling techniques to assess water quality. Automated water quality (8%) and automated water quantity (14%) measurements were less popular among municipalities. Half (50%) of the municipalities indicated that their stormwater program had not changed in the frequency of their water quality monitoring compared to three years ago, while forty-percent of cities indicated that they were monitoring more frequently in the same time frames. Water monitoring activities are summarized in Figure 2.

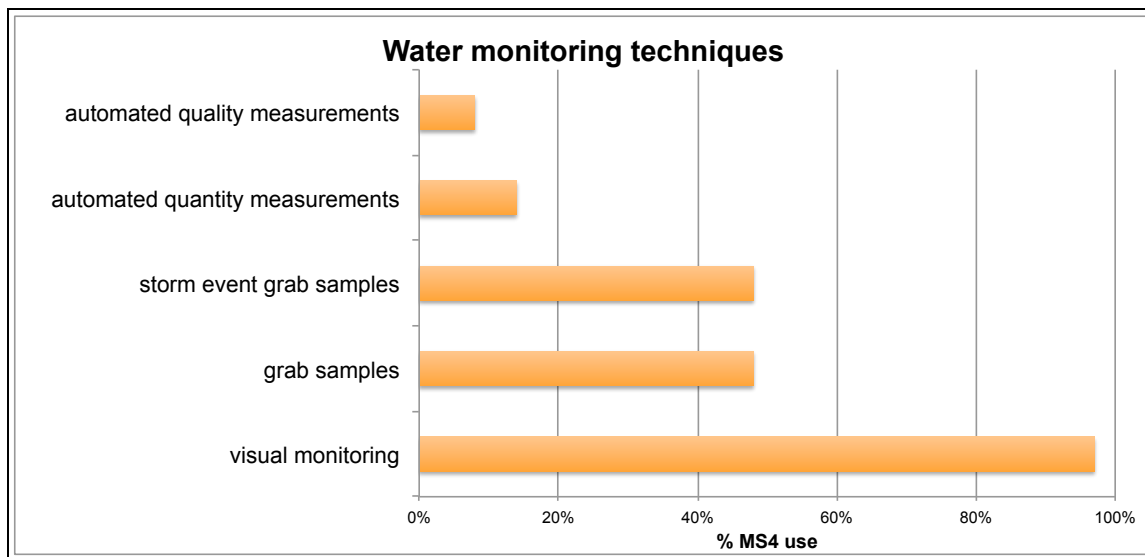


Figure 2. Water monitoring techniques used in Utah municipalities.

Respondents were also asked about the water quality conditions in their jurisdictions. Slightly less than half (44%) of the municipalities indicated that there were high levels of sediment in stormwater runoff within their jurisdiction, with twelve percent of municipalities indicating that they experienced high levels of nitrogen or phosphorus. Only five percent of municipalities responded that they had high *e. coli* levels within their jurisdiction; however, many municipalities (40%) did not know if they experienced high *e. coli* levels. Water quality conditions are summarized in Figure 3.

In terms of flooding, municipalities reported that rain events were the most common cause of flooding within their municipalities. Half (50%) of respondents indicated that flooding because of rainstorms occurred occasionally within their city. The least common form of flooding was associated with canal overflows or breaks, with thirty-eight percent of respondents indicating that this did not happen in their city.

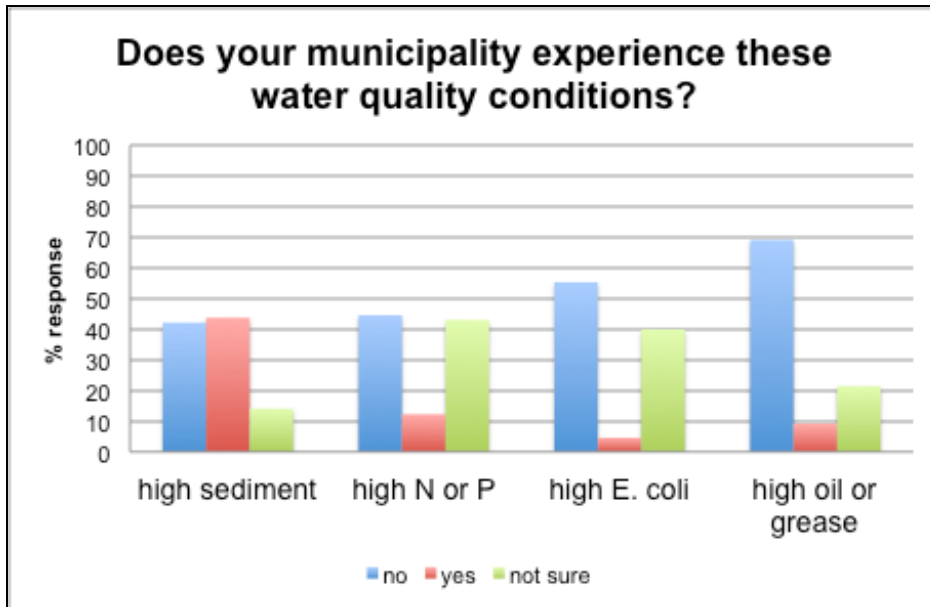


Figure 3. Water quality conditions as detected in Utah municipalities.

#### *Changes in the surrounding area*

A majority (63%) of respondents believed that the amount of impervious surface in their stormwater programs' jurisdiction had increased in the past few years, which reflects the high rates of urbanization in the state. The survey also asked about observed changes in rainfall. Seventy percent of respondents had not observed a change in the number of rain events over one-quarter of an inch, while twenty-three percent of respondents indicated that the number of these events were greater than in the past. Similarly, sixty-three percent of respondents did not observe a change in the number of 'intense' rain events or storms in the recent past, while thirty percent of respondents noted that these were occurring with greater frequency. The number of rain events on frozen ground also seemed to be occurring more frequently for one-third (34%) of respondents, while sixty-one percent did not see such a change.

### *Collaborations with other municipalities*

Respondents indicated high rates of interaction with other municipal stormwater program representatives (Table 2). Municipalities collaborate most regularly on public education efforts (70% indicated 'often'), and on educating developers and contractors (62% indicated 'often'). The topics that were the least likely to be discussed or coordinated upon were the content of stormwater ordinances (one-third indicated 'often') and on stormwater flows into or out of city boundaries (30% 'often').

Table 2. Extent of discussion or coordination among MS4 programs.

**How often do you discuss or coordinate with other MS4 stormwater programs on the following topics?**

Scale: 1 = 'never';  
5 = 'all of the time'

	mean	% often
Educating the general public	3.75	69.7
Educating developers and contractors	3.73	62.1
How to deal with Utah DWQ regulations	3.62	53.8
How to make overall improvements to your stormwater program	3.54	56.0
Best management practice recommendations for developers or contractors	3.43	44.6
Stormwater inspection criteria or procedures	3.33	42.4
Content of stormwater ordinances	3.24	33.3
Stormwater flows into or out of your city boundaries	3.02	30.3



### Use of private consultants

Over three-quarters (79%) of municipal stormwater programs consult with private firms in some capacity. Use of private consultants over a range of activities is summarized on Table 3. The most common activity for which consultants were hired was for designing city-owned stormwater infrastructure—twenty-five percent of cities ‘always’ contract out for this while another quarter (26%) never use private firms. The next-most frequently contracted-out activities were the writing of SWMPs (19% ‘always’ contract this out) and municipal stormwater pollution prevention plans (SWPPPs) (14% ‘always’ contract this out). Municipalities reported that the least-frequently outsourced activities were water quality sampling (72% ‘never’ do this) and stormwater inspection (77% ‘never’ do this).

Table 3. Extent and type of private firm use among Utah municipal stormwater programs.

<b>How often does your municipality hire private consultants to carry out each of the stormwater management activities listed below?</b>			
Scale: 1 = ‘never’; 5 = ‘always’	mean	% ‘never’	% ‘always’
Design city-owned stormwater infrastructure	3.17	26.2	24.6
Write your MS4’s stormwater management plan (SWMP)	2.75	35.4	18.5
Write your MS4’s stormwater pollution prevention plan (SWPPP)	2.68	33.8	13.8
Review proposed residential and/or commercial stormwater plans	2.55	40.9	19.7
Write or update MS4 stormwater ordinances	2.34	40.0	9.2
Inform your organization of changes in stormwater regulations or policies	2.20	43.9	6.1
Conduct public education activities	1.92	51.5	3.0
Complete annual reports	1.91	63.6	9.1
Communicate your stormwater program’s concerns to state regulators	1.83	52.3	0.0
Coordinate stormwater coalition activities	1.76	53.0	1.5
Gather public input, comments, or complaints	1.62	63.1	1.5
Monitoring or water quality sampling activities	1.53	71.9	3.1
Perform stormwater inspections	1.36	77.3	3.0

*Stormwater and irrigation*

Nearly all (99%) of the municipalities that responded to the survey indicated that there were irrigation groups operating within their boundaries. Eighty-two percent of Utah MS4s discharged stormwater runoff into irrigation canals. Forty-three percent of responding municipalities allowed for their stormwater infrastructure to convey irrigation water.

Of the cities that have irrigation infrastructure (e.g., canals, pipes, or ditches) within their jurisdictions, just over half of these cities (55%) have a formal management agreement with irrigation groups, while seventy percent of these cities have informal agreements (municipalities typically have more than one type of agreement with the many irrigation groups operating within their jurisdictions) (Figure 4). In contrast, municipalities in which curb-gutter stormwater infrastructure is used to convey irrigation water have higher rates of formal (75%) and informal (82%) agreements with irrigation groups. Co-management boards, (in which there is an advisory group with representatives from both the city and irrigation organizations) seem to be popular management options, as they are found in thirty-eight percent of municipalities that discharge stormwater into canals, and in fifty-two percent of cities that convey irrigation water in storm drains.

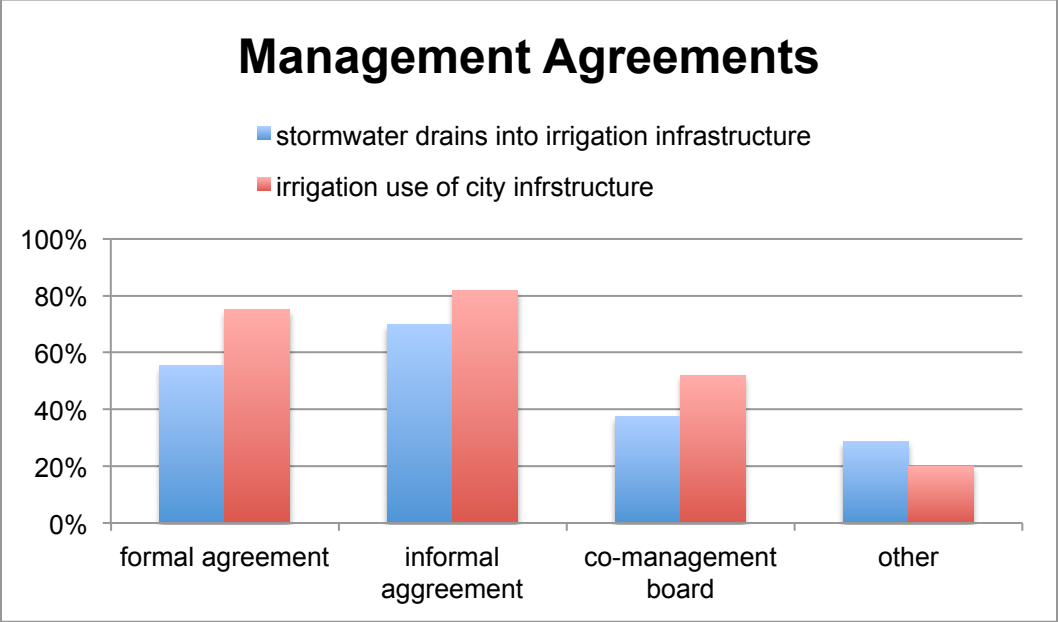


Figure 4. Management agreements between MS4 stormwater programs and the irrigation groups operating within their jurisdictions.

### *Information availability and use*

Stormwater managers indicated that, on average, they were 'satisfied' with the amount of available information about technical or engineering aspects of stormwater management. The most useful sources of stormwater management information were conversations with other stormwater coalition members (66% responded 'very useful'), other stormwater managers (57% responded 'very useful'), and coalition meetings (61% responded 'very useful'). Responses to stormwater information source usefulness are summarized on Table 4.

Stormwater managers noted that, on average, a demonstration site where more could be learned about stormwater technologies or infrastructure would be 'useful.'

Table 4. Usefulness of information sources for stormwater managers.

How useful are the following information sources for your stormwater management activities?

<u>Scale: 1 = 'very not useful'; 5 = 'very useful'</u>	<u>Mean</u>	<u>% 'very useful'</u>
Coalition member conversations	4.61	66
Other stormwater managers	4.54	57
Coalition meetings	4.52	61
Consultants	4.06	31
USWAC resources	3.98	27
Utah DEQ-DWQ website	3.84	21
Professional publications	3.62	14
EPA website	3.56	13
University researchers	3.27	11

## Program Challenges

Stormwater program responses indicated that the greatest challenge that they face is keeping up with required paperwork (68% responded this was a 'major challenge' or 'the biggest challenge we face') (Figure 5). Municipalities also indicated that the 'biggest challenges faced' were filling their inspection obligations (12%) and replacing old infrastructure (12%). Municipalities indicated that the least prominent challenges of those considered in the survey were educating the public (28% 'major challenge' or 'the biggest challenge we face') and educating people within city government (29% 'major challenge' or 'the biggest challenge we face').

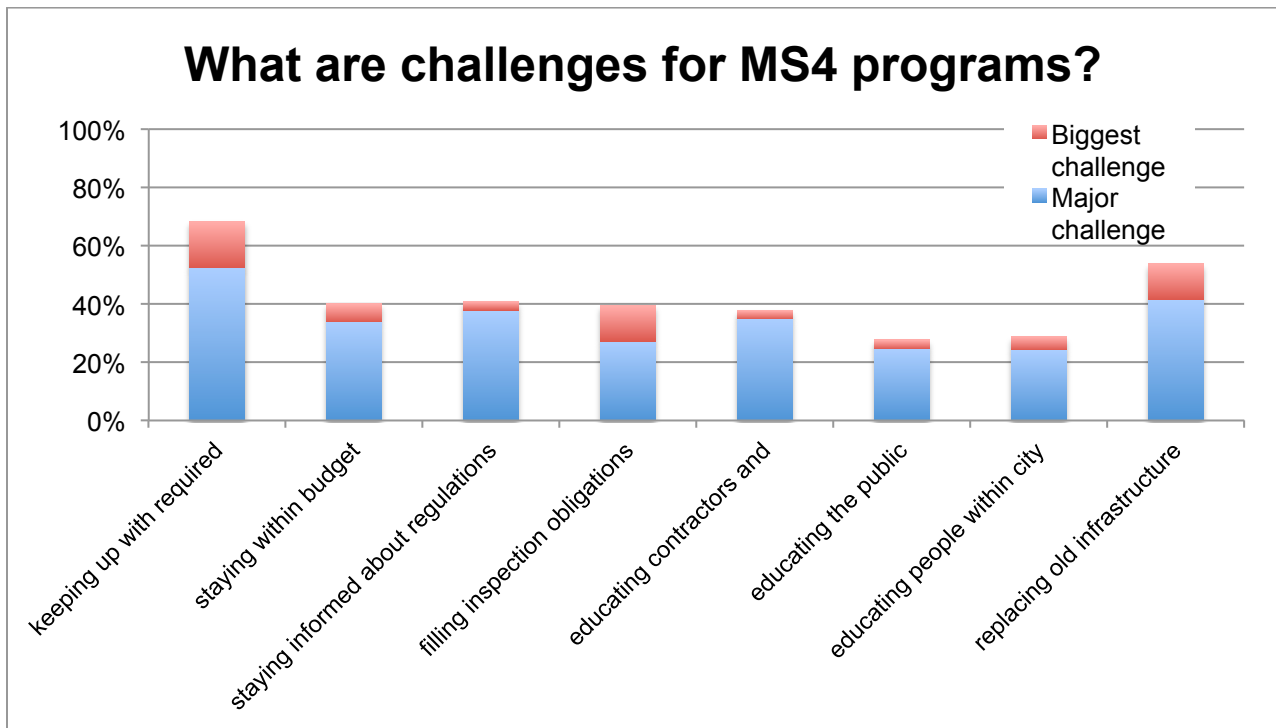


Figure 5. Challenges faced by Utah MS4 programs.

## What is important to MS4 programs?

Overall, municipal stormwater programs indicated that increasing public understanding of stormwater management and reducing the chances of flooding were of the greatest importance for stormwater programs (95% indicated 'important' or 'very important' responses) (Figure 6). A majority (55%) of stormwater programs also indicated that complying with federal laws was 'very important' to their program. Being a good environmental steward was also an 'important' aspect of the stormwater program for fifty-four percent of municipalities.

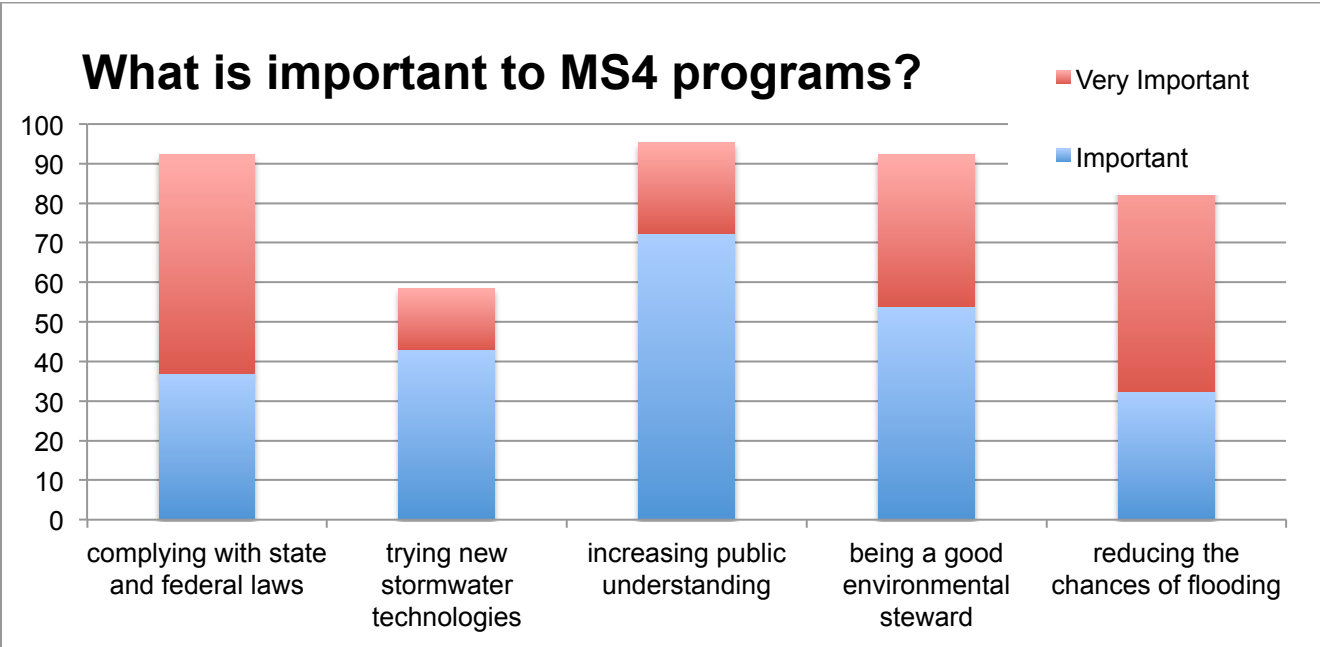


Figure 6. Areas of importance for MS4 programs.

## Findings: Construction & Industry

### Program challenges

Overall, construction and industrial programs exhibited lower rates of challenges experienced within their programs compared to responses from the municipal programs (Figure 6). The greatest challenge that these stormwater programs face is staying informed on stormwater regulations and policies (31% indicated this was a 'major challenge' or 'the biggest challenge faced'). Construction and industrial programs were the least challenged by staying within their programs' budgets (18% indicated this was a 'major challenge' or 'the biggest challenge faced').

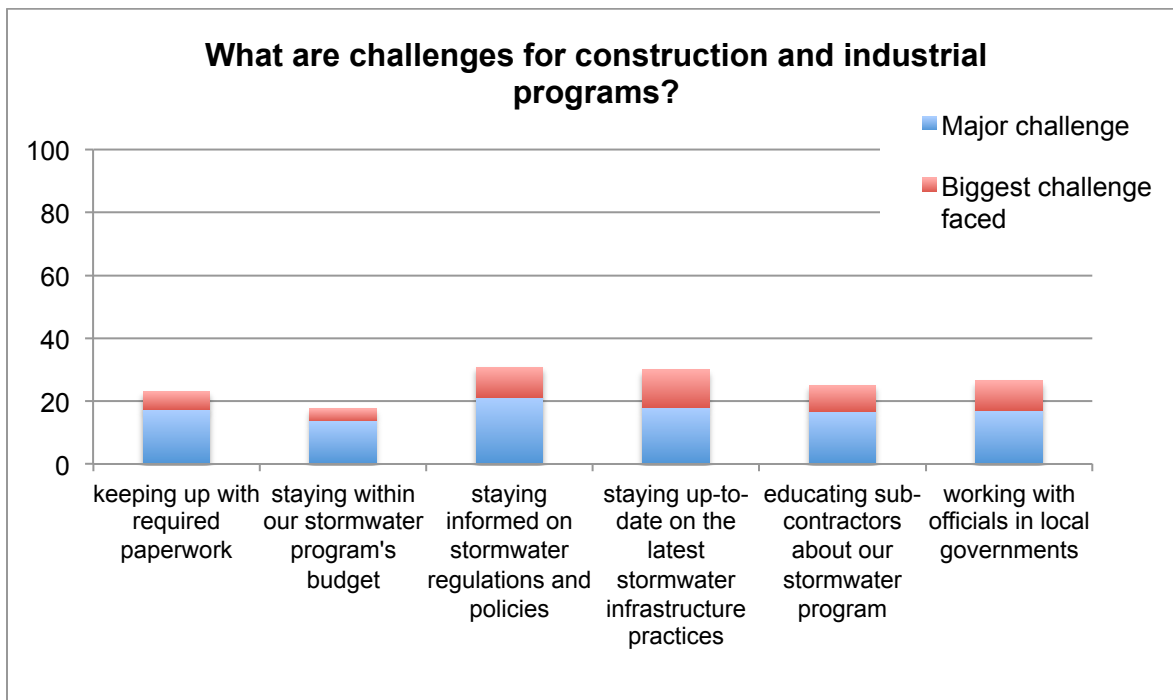


Figure 7. Program challenges experienced by construction and industrial stormwater programs.

### *Use of private consultants*

Thirty-seven percent of the responding stormwater managers indicated that their construction or industrial program uses private consultants in some capacity (Table 5). The most frequently contracted-out activity considered in the survey was the design of stormwater BMPs for construction sites or industrial facilities (21% of companies 'always' do this).

Table 5. Extent and type of private firm use among construction and industrial stormwater permittees.

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**How often does your company hire private consultants to carry out the stormwater management activities listed below?**

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Scale: 1 = 'never'; 5 = 'always'	Mean	% never	% always
Design stormwater BMPs for your facilities or sites	3.32	5	21
Inform your organization of changes in stormwater regulations or policies	2.74	21	16
Perform stormwater inspections	2.42	32	5
Communicate your stormwater program's concerns to state regulators	2.42	32	11
Monitoring or water quality sampling activities	2.37	42	16

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*What is important to construction and industrial programs?*

The most important aspect of stormwater management to construction and industrial programs was complying with state and federal laws (91% responded 'important' or 'very important') (Figure 7). The second-most important area for these programs was being a good environmental steward, with forty-two percent of programs indicating this was 'very important' and forty-six percent of programs indicating this was 'important.' The least important areas were trying new stormwater technologies (25% 'important' or 'very important' responses) and increasing public understanding (28% 'important' or 'very important' responses).

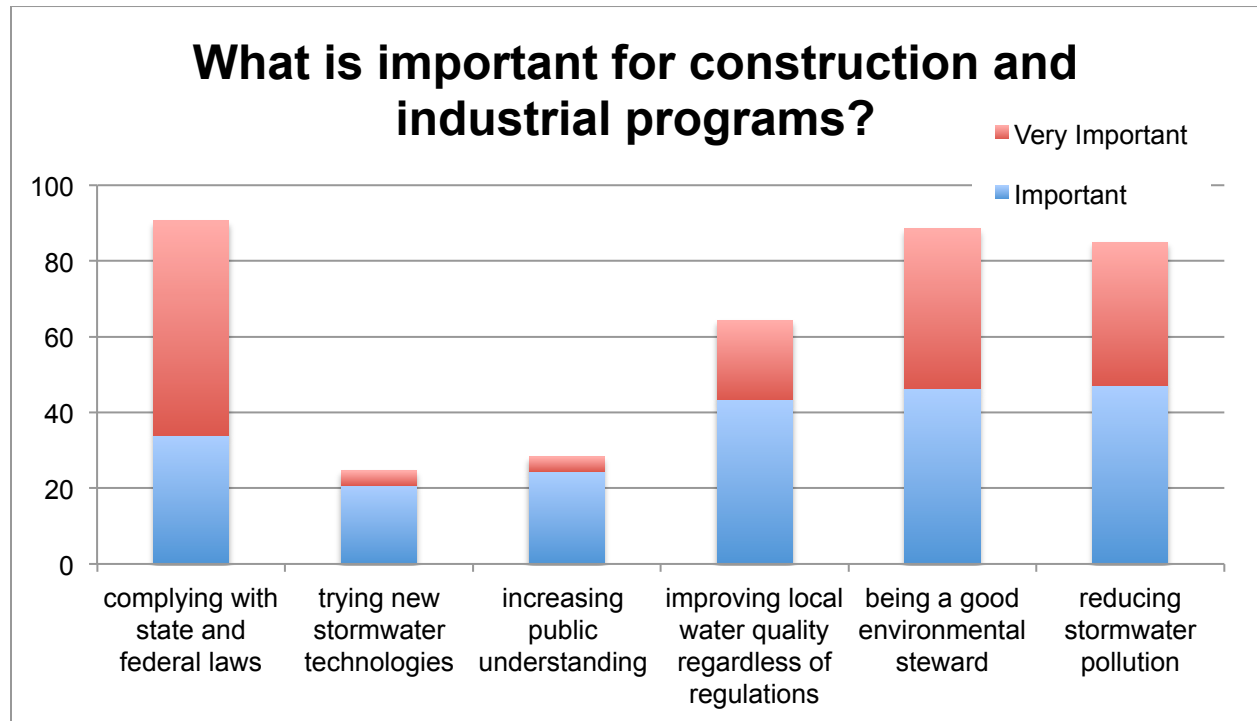


Figure 8. Areas of importance for construction and industrial stormwater programs.