3. Have Programs and Permits Adequately Evolved To Address New Challenges?

	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree	TOTAL	Strongly Agree or Agree	Strongly Disagree or Disagree
We should continue on the current course of MS4 program improvement based on iterative implementation and adaptation of MCMs and management practices to the MEP. In some places, we just need to do a better job under the existing program.	5	7	2	12	3	29	41%	52%
Permitting based on implementation of minimum control measures and adaptive management has not been effective enough; new permitting and program implementation approaches are needed.	9	13	1	5	1	29	76%	21%
Some MCMs and other program elements should be tailored and scaled to emphasize productive activities and deemphasize less productive activities.	14	15	0	0	0	29	100%	0%
Many permit provisions have been insufficiently clear and enforceable; future permits need to include clearer, more measurable requirements.	13	10	3	3	0	29	79%	10%
It is more difficult to implement specific requirements (e.g. localized water quality issues) in general MS4 permits than in individual permits.	7	7	9	4	2	29	48%	21%
Requirements for larger (Phase 1) and smaller (Phase 2) communities should converge over time. In most cases, the Phase 2 permit requirements should be the consistent "floor" for the Phase I permits.	8	15	3	3	0	29	79%	10%
The needs and capabilities of Phase 1 and Phase 2 communities are fundamentally different and should have different permit requirements.	2	5	1	17	4	29	24%	72%

4. Developing Viable Stormwater Program Capacity.

	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree	TOTAL	Strongly Agree or Agree	Strongly Disagree or Disagree
Many stormwater programs lack sufficient funding and program implementation capacity.	24	5	0	0	0	29	100%	0%
The entire MS4 program would benefit from having EPA and States provide stronger technical/managerial/financial guidance, assistance, model ordinances/materials and oversight to support successful local MS4 program development.	12	10	3	3	1	29	76%	14%
To be fully effective, local stormwater programs need to invest in sound long-term planning incorporating asset management and funding plans.	22	7	0	0	0	29	100%	0%
Permits should be written to better assist and incentivize development of necessary local program capacity.	13	8	4	3	1	29	72%	14%
Substantial changes in requirements from permit to permit impedes development of stable programs.	8	7	6	8	0	29	52%	28%
Community financial capability and financing efforts should be considered in establishing permit implementation timeframes.	11	12	3	2	1	29	79%	10%
There should be a national initiative to promote the implementation of stormwater utilities.	12	9	6	1	1	29	72%	7%

5. Enabling a Broader Program Vision.

	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree	TOTAL	Strongly Agree or Agree	Strongly Disagree or Disagree
There is increasing interest in building programs that address water quality and other urban stormwater management goals (supply augmentation, flood control, green infrastructure, green streets, etc).	15	11	2	1	0	29	90%	3%
Additional guidance and technical assistance will be needed to help local programs build programs that address multiple objectives beyond water quality protection.	14	12	2	0	1	29	90%	3%
Permits should be improved to better support innovative approaches by incentivizing multi-objective program planning, enabling risk-sharing, and establishing clearer adaptation frameworks.	15	7	6	1	0	29	76%	3%
We should not expect too much from the MS4 permitting program. We should recognize the limits of water quality permitting and rely on other methods and programs to achieve some of the broader water quality goals.	2	4	7	12	4	29	21%	55%
Water quality based permitting is essential for municipal stormwater programs to improve and for urban water quality goals to be met.	16	7	3	2	1	29	79%	10%

6. Making Public Outreach and Involvement Work For The Program.

	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree	TOTAL	Strongly Agree or Agree	Strongly Disagree or Disagree
Broad public education/outreach efforts have had limited effectiveness.	8	13	2	6	0	29	72%	21%
More targeted public outreach and involvement will more effectively change key behaviors (e.g., trash control).	5	16	6	2	0	29	72%	7%
More targeted public outreach and involvement will more effectively build needed support for program funding and capacity building.	9	15	4	1	0	29	83%	3%
Providing meaningful opportunities for public involvement in program design assists in building public support and perceived program legitimacy.	9	14	3	3	0	29	79%	10%
One of the goals of MS4 public education has to be to reinforce local knowledge and understanding that is sufficient to support local compliance.	7	12	8	2	0	29	66%	7%

7. Tailoring IDDE to Fit Local Needs.

	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree	TOTAL	Strongly Agree or Agree	Strongly Disagree or Disagree
IDDE programs have been effective in identifying non-stormwater sources in industrial areas and in addressing household lateral issues.	0	15	11	3	0	29	52%	10%
IDDE efforts are less effective in addressing non-stormwater sources in areas with fewer industrial/commercial land uses.	2	9	13	4	1	29	38%	17%
IDDE efforts are less effective after initial system surveillance efforts are complete.	3	9	10	6	1	29	41%	24%
Some common elements of IDDE programs should be retained (e.g., system mapping, public complaint hotlines) even if system surveillance is reduced.	13	13	3	0	0	29	90%	0%

8. Tailoring Industrial/Commercial Programs and Aligning with Industrial Permits.

	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree	TOTAL	Strongly Agree or Agree	Strongly Disagree or Disagree
Some common elements of industrial/commercial programs (e.g. routine business inspections) have had limited utility for stormwater quality protection.	1	7	11	10	0	29	28%	34%
Relationships between industrial stormwater permit requirements and MS4 program requirements are often unclear and should be clarified in future permitting actions.	8	13	3	5	0	29	72%	17%
Local programs that target specific pollutant sources (e.g. trash from restaurants or metals from parking lots) are likely more effective than generic industrial/commercial programs.	7	19	2	1	0	29	90%	3%
Program evaluation approaches should be revamped to better evaluate effectiveness of local industrial and commercial programs.	6	16	6	1	0	29	76%	3%
Having the MS4 permittees take on industrial site compliance makes sense for Phase 1 permittees but not Phase 2 permittees.	1	3	3	16	6	29	14%	[illegible]
Both Phase 1 and Phase 2 permittees should be responsible to assessing industrial site compliance.	6	11	6	4	2	29	59%	21%

9. Maintaining Solid Municipal Housekeeping That Adds Value.

	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree	TOTAL	Strongly Agree or Agree	Strongly Disagree or Disagree
Effectiveness of municipal housekeeping measures varies depending upon local settings and land uses (e.g. more effective where streets and municipal yards are significant pollutant sources).	4	19	4	2	0	29	79%	7%
This MCM should be reduced in scope (e.g., less frequent inspections and street sweeping) where shown to provide little water quality improvement.	9	13	3	4	0	29	76%	14%
Requiring more holistic asset management approaches facilitates tailoring of municipal MCM approaches to best support local asset mixes and issues.	12	10	7	0	0	29	76%	0%
Implementation of a more robust, standardized evaluation process would improve ability to verify effectiveness of municipal housekeeping measures.	4	12	13	0	0	29	55%	0%

10. New/Redevelopment and Post Construction.

	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree	TOTAL	Strongly Agree or Agree	Strongly Disagree or Disagree
Surrogate control measures (e.g., flow/rainfall retention and infiltration) are promising as they are easier to require, implement, and evaluate than stormwater quality responses.	8	15	4	2	0	29	79%	7%
New/redevelopment requirements are unlikely to yield substantial water quality improvements in fully built-out areas unless comprehensive retrofit plans are implemented.	14	11	0	1	3	29	86%	14%
Offsite crediting approaches are promising and should be encouraged.	8	12	6	2	1	29	69%	10%
Permitting language concerning offsite crediting programs should contain clearer program design requirements to ensure crediting programs operate effectively over the long term.	10	13	6	0	0	29	79%	0%
Post construction O&M requirements need to be more clearly and specifically expressed in permits.	7	14	4	4	0	29	72%	14%

11. Targeting Stormwater Controls To Remedy Water Quality Impairments.

	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree	TOTAL	Strongly Agree or Agree	Strongly Disagree or Disagree
There is increasing recognition of the need to better address specific water quality issues and TMDL implementation needs in MS4 permits.	11	12	2	2	2	29	79%	14%
It has been difficult to interpret many TMDL stormwater allocations in establishing workable MS4 permit limitations.	10	15	2	1	1	29	86%	7%
Permitting authorities and local programs need assistance in identifying methods to establish clearer, more reliable linkages between program actions and water quality outcomes.	12	14	2	1	0	29	90%	3%
Receiving water and end-of-pipe limitations alone have been ineffective in facilitating and showing effectiveness of stormwater management practice implementation.	8	10	7	3	1	29	62%	14%

12. Improving Accountability of BMP-Based Approaches to Water Quality Attainment.

	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree	TOTAL	Strongly Agree or Agree	Strongly Disagree or Disagree
Implementation of action based requirements (e.g. BMP implementation) to meet water quality requirements may be easier to evaluate than outcome-based measures (e.g., receiving water limits).	10	13	5	0	1	29	79%	3%
Establishing reliable cause-effect relationships between control strategies and water quality goals is challenging and may require difficult modelling or other analysis.	9	16	3	1	0	29	86%	3%
Robust modeling and planning frameworks can facilitate consideration of both water quality and non-water quality goals and constraints and support holistic program planning.	14	13	2	0	0	29	93%	0%
Alternative compliance approaches should provide for ongoing monitoring and evaluation to evaluate and verify model accuracy and control effectiveness.	11	13	4	0	1	29	83%	3%

13. Improving Monitoring, Evaluation, Tracking, and Reporting.

	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree	TOTAL	Strongly Agree or Agree	Strongly Disagree or Disagree
Monitoring requirements should be revised to make use of improved monitoring design and technology approaches.	14	13	1	1	0	29	93%	3%
Program evaluation would be improved if there were greater focus on program activity and practice tracking and evaluation to complement water monitoring.	7	9	8	5	0	29	55%	17%
Programs should develop asset management programs that enable real-time tracking and analysis of system condition and maintenance needs.	14	7	7	1	0	29	72%	3%
Reporting requirements should be revamped to reduce "paper" reporting and move toward electronic reporting of quantifiable program activity and water quality metrics.	15	11	3	0	0	29	90%	0%
Requiring every Phase 2 MS4 permittee to monitor is not a wise allocation of limited local resources that are better applied to local program implementation.	5	9	5	8	2	29	48%	34%
Phase 2 MS4 permittees should be expected to conduct monitoring and evaluation to assist in evaluating program effectiveness and permit compliance.	2	15	5	3	4	29	59%	24%
There is significant uncertainty associated with stormwater monitoring. There should be a national initiative to apply the known uncertainty quantification and analytic techniques to stormwater monitoring.	8	8	10	1	2	29	55%	10%

14. What are the key areas in which MS4 permits and programs can be improved in the future (please feel free to elaborate on issues/topics addressed above and/or to include issues/topic areas not addressed above). (Actual responses; not edited)

- Greater flexibility to tailor "traditional" stormwater program elements within permit requirements to address local issues; creating a stronger linkage between water quality drivers and program actions; improving decision-making through informative monitoring and evaluation and adaptive management; and development of stormwater quality asset management plans, CIPs, and financial strategies.
- Improved funding of stormwater utilities for watershed-based permitting with long-term consistency, well-designed monitoring programs, more emphasis on true source control, and the flexibility and incentives for creativity.
- Get rid of the requirements that are not working.
- Better messaging of WHY we are doing these activities and creating better capacity for relaying these benefits to the public. They have to have some level of understanding, ownership, and want for the activities to be willing to pay for them. Program funding and creating utilities still needs focus. This is a major constraint for the vast majority of programs. Didn't see much mention of "scalability" -- municipalities are of all different sizes and issues; the MS4 program requirements should be able to scale accordingly. Regionalization of efforts are probably worth further consideration, but while considering this, we need to be cognizant of how to evaluate compliance.
- Assess management, including of green stormwater infrastructure (with effectiveness tracking, maintenance tracking, and targeted pollutant reduction monitoring); encouraging multi-benefit green stormwater infrastructure through new/redevelopment requirements, etc.
- Coordinating MS4 permit requirements or goals with other programs and goals in the permitted areas (e.g., public and private infrastructure work, transportation funding and priorities, existing wastewater treatment plants (in separate sewer areas), and land use decisions).
- MS4 programs must be given a higher status by local governments such as through formation of utilities. Permits should include incentives for programs with dedicated high-level authority and funding, and, ultimately, require such.
- Metrics to evaluate effectiveness and tools to track metrics.
- Realistic goals -- too many times regulators think they can solve a problem by putting it in a permit. The homeless are contributing trash and bacteria, but it is a much larger issue to address and won't be solved through a stormwater quality program.

- Shorter, clearer permits. More focused reporting. Monitoring to determine compliance. If alternative compliance programs are going to be used, robust modeling needs to ensure WQSs are being met.
- Greater emphasis on surrogate control measures and development/redevelopment opportunities to modify urban catchments should be incentivized within MS4 permits as a means of ensuring long-term water quality results.
- MS4 permits and programs can be improved by tailoring them to the specific water quality issues of the receiving waters and improvements in source control specific to the MS4. Measurable metrics to track success are key to implementing an adaptive MS4 program.
- Need for green infrastructure for stormwater management is likely going to be more important for issues beyond water quality (e.g., climate change adaptation, flooding, etc.), so set permits up to push agencies for long-term broad GI implementation -- focusing on achieving pollutant reduction forces agencies to implement GI in areas that don't support other community benefits and makes it a very tough road to implement. Allow reduction in funding certain compliance activities if agencies commit that funding toward a long-term GI implementation approach (unless we get new funding, need to free up existing funding streams to build projects but can't because it's all tied up in compliance efforts). Develop permits that directly support integrated, multi-benefit planning and implementation.
- Need better info on the cost-effectiveness of different control measures (e.g., how many pounds of pollutants are removed per dollar spent on public education? Industrial inspections? Street sweeping? Catch basin cleaning? Green infrastructure retrofits?) Such info would allow permits to be structured toward implementation of the most useful controls.
- Programs need to be allowed to adjust to known pollutants and should not be a one size fits all but should be based on regional weather patterns.
- Reduce investment in less productive program elements and focus more on more productive investments. Make requirements clearer, measurable, and accountable. Recognize financial limitations in setting compliance timeframes and help cities more to develop financing strategies.
- Clear, measureable requirements spelled out in permits.
- Public education and information -- the public does not know or appreciate what they are paying for and what they will get. Eliminate much reporting and focus on receiving water impairments. Use source control as a primary BMP
- The MCMs of IDDE, post construction, and good housekeeping provide the greatest opportunity for gaining environmental improvements. Permits should include clear and specific requirements for these measures to ensure they are effective.
- Permit writers need increased understanding of how municipal programs are funded.

- Permit coverage area: MS4s are increasingly asserting no discharge to WOTUS in parts of their jurisdiction. Permits should resolve this issue with clear statement on applicability. While requirements for Phase Is and IIs should start to merge, some Phase IIs are so small they won't possess the capacity to meet the requirements. An alternative that aligns with their threat to water quality should be available for the smaller MS4s. Low capacity Permittees present a significant dilemma: Alternative Compliance pathways only work when Permittees have capacity to develop and implement adaptive management, but at the same time, they will fail with prescriptive permits.
- I will refer to the 4th question in number 3 above. Clearer more understandable language would be of great assistance. However, this does not mean we need more measurable requirements. I think we need clearly written permits--some currently seem to be written as a legal compromise where there is no common understanding.
- MCM implementation, in general, does not equal water quality protection. We should be moving towards numerical water quality based limits with better modeling and monitoring. The strength of the NPDES program is when EPA and states establish numeric performance-based targets that encourage and require local innovation.
- Enforcement; water quality based effluent limits; new and redevelopment standards.
- improve calculations methodologies and load reduction estimates, technology transfer for new research results, support stormwater research, fund SW education at levels similar to recycling and anti-smoking campaigns.

15. Do you have any additional comments or suggestions for the workshop? (Actual responses; not edited)

- I'm looking forward to it! Because my background is more academic (no hands-on, practitioner experience), I expect to learn a great deal from the workshop. Hopefully I can make some useful contributions as well.
- How to develop effective strategies that maximize water quality benefit given the range of permittees (progressive actors who are leading the way, straightforward permit compliers, and those going more slowly/cautiously).
- Prioritized water quality goals based on risk will help effectiveness. Indicator bacteria criteria will never be met during storms, but controlling human sources can limit the risk. Meeting Title 22 drinking water standards for MUN beneficial uses during short term and infrequent storm events will not be accomplished but can for the rest of the year.
- The workshop (or subsequent workshop) should focus on how has a widespread lack of enforcement lead to continuing non-compliance across the state. And how is California, and other states, analyzing the voluminous monitoring data collected under MS4 and industrial stormwater permits? How can that data assist with or help motivate compliance/improvements?

- Seems like it will be challenging to have a focused discussion that doesn't get into the weeds of each participant's local experience. Perhaps need to propose a new approach and have people react to it or really facilitate discussion to get useful input out of each session that can feed into future efforts.
- It's helpful to set forth clear water quality objectives for the program -- modelling can then let the MS4 know how many BMPs are enough. I suspect in some parts of the country, trading between MS4s and agricultural sources could be useful -- I've lost track of where trading programs are.
- MS4s are unique as permittees--they are not business or industry. They are regulators who, for the most part, are heavily invested in sustainability. Guidance and clear communication of expected actions are far more valuable than new permit language. Most states have laws that prohibit permit language that allows for authority to be taken beyond what is written into the CFR. If permit language continues to become more broad without appropriate authority or justified by impaired waters, significant argumentation and even legal challenges can be expected.
- Reserve time for each group/team/table to create a consensus of action items.
- It would be great if the group to come up with one or two specific recommendations for permit improvement that could be implemented everywhere.
- Need to discuss permit in the context of acquiring/requesting funding.
- Can we discuss a rough time frame for addressing the key issues around which there is consensus?
- I think developing common understandings of the words we use will take considerable efforts but be critical to success. There are a lot of variables and differences between communities, states, and regions.
- Please discuss using audits and reporting to the full extent; please discuss state and local permit responsibility duplication (const., industrial) and fee allocations; please discuss representative monitoring instead of having every permittee monitor; and please discuss better approaches to street sweeping and urban trees.