Topic	Questions for 2014-2108 RSMP effectiveness studies • Questions in gray are being addressed by first round of studies identified in 2014 and are not targeted for the second round in 2016.
Source control: temporary erosion control performance and inspections *No studies in first round* and no proposals	• Conduct a study measuring collective erosion control BMP performance with regard to meeting water quality standards. Combine this with an inspection study. Differentiate between situations where approved stormwater site plans are not being followed versus situations in which plans are not adequate to protect water quality. • What frequency of construction erosion and sediment control inspections are most effective for achieving compliance with codes/ordinance requirements at new development and redevelopment project sites? Gather professional knowledge. Look at balance of benefits of pre-, during-, and post-rainfall inspections to confirm implementation of stormwater site plans and prevent, identify, and respond to problems.
Source control: inspections of existing sites *One study in first round* – combined two proposals	• What is the lowest frequency of inspections that maintains the functionality of stormwater treatment and control facilities and ensures the proper use of source control BMPs at businesses? ○ Which is more effective for specific high value BMPs: focusing on the property owners or focusing on the business owners, or a combination of the two? ▪ Target both structural and operational BMP types, and situations where a business owner is and is not cooperative and willing. ○ Based upon follow up inspection, which required BMPs were implemented and which optional BMPs were installed? ▪ What were the primary barriers to adopting or installing BMPs? ○ Identify situations where technical assistance and/or follow-up inspections are needed to ensure required source control BMPs are implemented. ▪ Gather data about percent compliance. Partner with Local Source Control specialists to do this study. • Are stormwater source control inspections more effective if combined with other types of inspections? How can coordination of inspections be improved or better organized regionally for referral of issues to the correct entity?
Public education and outreach *No studies in first round* – not requested because we thought that others were doing these studies	• What is the toxics loading from a large employee parking lot that participates in a vehicle leak detection and fix program compared to toxics loading from a similar parking lot that does not participate in a vehicle leak detection and fix program? • The re-launch of "Puget Sound Starts Here" in 2013 focused on lawn care efforts. Rather than relying on people reporting reduced chemical use, identify more appropriate intermediate outcomes (i.e., reduced sales, behavior change) to measure objectively to help answer these questions: ○ Are nutrient levels in stormwater reduced following an extensive natural yard care education program? ○ Are pesticide concentrations and number of detects reduced in an

	urban stream following general awareness? • Does a fundraiser car washing education program result in a reduction in untreated charity car wash water entering storm drains? What are the best education methods or combination focused on the charities and the property owners with responsibility?
O&M – Pollution Prevention: Catch basin inspections *Addressed in first round – we requested the study*	• Compile and synthesize the catch basin inspection data previously collected by Phase I and some Phase II permittees. Analyze the data to help permittees determine individual inspection frequency needs to comply with new permit requirements based on permittees' known areas of concern (and relative unconcern).
Low Impact Development (LID): Flow and pollutant reduction benefits to receiving waters *5 studies in first round:* Bioretention hydrologic performance Bioretention soil mix toxicity reduction Collective impact of rain gardens/bioretention Pollutant removal of bioretention with fungi PCB cycling in rain gardens/bioretention	• What collective effect do installations of stormwater retrofits have on receiving waters? ○ Look for opportunities to compare receiving water conditions before and after retrofits are applied. Focus on developed areas. Modeling will be useful. ○ How can we avoid failures? ▪ How can facilities be better sized and designed to avoid bypass during moderate rainfall events? ▪ How do we best ensure that LIDs are not only properly designed but also properly constructed/installed? ▪ How do you do cost-effective testing for single family infiltration? • At what density of LID measures will a developed basin show measurable differences in pollutant loads compared to a similar basin with a lower density of LID measures? ○ What are the watershed scale effects of LID alone? ○ What administrative and other actions are needed and effective to achieve more LID implementation? ○ What are site suitability characteristics for deciding what LID to apply where? • Conduct soil amendment and bioretention soil mix leaching studies combined with plant selection studies for optimum removal of nutrients, bacteria, and metals. ○ Where and when are nutrient and metal outputs from LID of concern?
LID: long-term performance *No studies in first round;* one proposal received and ranked lower	• What type and frequency of maintenance is needed to ensure the longevity and long-term performance of bioretention facilities? How does maintenance affect function? Where is minimal maintenance of LID installations appropriate? ○ Consider a visual inspection and paper approach to this study, rather than measuring. ▪ Use records from annual inspection of new systems as a data source. ○ Study long-term infiltration rates. ○ Study long-term adsorption capacity.

Retrofits: Water quality and habitat benefits of retrofit efforts *3 studies in first round:* Redmond paired watersheds Echo Lake highway Federal Way ponds	• How effective are individual and collective retrofit BMPs and LID most effective at reducing stormwater impacts in receiving waters? ○ Perform field studies of existing urban retrofitted BMPs in WWA to assess effectiveness at pollutant removal. ○ Select a stream in a developed area that is funded for retrofitting and establish baseline conditions with in-stream monitoring of water quality and hydrology. Measure changes in the stream's water quality and hydrology in response to retrofits being implemented. ○ Conduct an extensive literature review, build on current work. ○ Compare model predictions to field data. ○ Compare BMPs and combinations for specific pollutants. ○ Develop urban-specific models.