# Draft: Project ideas for Round 5

## Permit-New Ideas:

1. Where are the geographic priorities for stormwater retrofits necessary to intercept road-derived toxics (6ppd, PAHs, etc.) to protect salmonid populations in Puget Sound (i.e. coho and chinook), especially important prey populations for Southern Resident Killer Whales? (supplement existing research on this topic)
2. Conduct a study to evaluate if the estimated effective impervious area is a better predictor than total impervious area of stormwater quality.
3. How can existing GIS data and aerial imagery be used to identify locations for stormwater banking and other BMPs?
4. Evaluate the effectiveness of MS4 Permit-required-staff training efforts in meeting intended outcomes. Measured outcomes could be participant knowledge, skills, behaviors, or program outcomes. Include assessment from the perspectives of the trainers, trainees, and program managers. Review lessons learned to glean what works and what doesn't.
5. To what extent may stormwater infrastructure impact the effectiveness of physical habitat restoration projects (e.g., culvert replacements)? Consider using a Before-After-Control-Impact (BACI) study design and evaluating the potential for inadvertently creating ecological traps where habitat-like features may attract wildlife without supporting their long-term survival.

## Permit-R4 Ideas:

1. Fill gaps on benefits of retrofitting, restoration of riparian buffer, property acquisition, removal of impervious surfaces, floodplain reconnection or other actions used to address stormwater runoff not otherwise required in S.5.C (from Structural Stormwater Controls, Science Review and Synthesis Project)
2. Investigate other NPDES permit thresholds to see if they are appropriate for 6PPDQ; also review reporting data from other permits for information pertinent to treating 6PPDQ
3. ~~Improve future Permit annual report questions for quantifying data for regional learning by analyzing Annual Report data, including analysis of narrative questions.~~
4. ~~Regional~~ ~~stormwater discharge monitoring study (Appendix 9, WWA Permit) to characterize emerging pollutants in stormwater, e.g. 6-PPDQ, PFAS/PFOS, micro- and nano- plastic contamination in stormwater.~~

## Source Control-New Ideas:

1. Conduct a stormwater discharge monitoring study to characterize stormwater pollutant at different traffic volumes (e.g. low, medium, high traffic areas). Consider building on previously collected data under the 2013 WSDOT highway characterization study and the on-going SAM study [Stormwater characterization](https://ecology.wa.gov/regulations-permits/reporting-requirements/stormwater-monitoring/stormwater-action-monitoring/sam-effectiveness-studies/stormwater-characterization).
2. Which source control BMPs are most effective at reducing pollutants from key land uses? Identify other sinks of TWPs that are not mitigated through street sweeping.
3. Develop guidance and methods for capturing and containing PCBs. Which source control BMPs are the most effective at minimizing PCB’s entering the MS4? What onsite or small treatment devices could be used to remove PCBs from washwater? What can be done to prevent the PCBs from entering the MS4 passively (i.e. when the building is just sitting in place and not being washed or demolished)?
4. What are the most accurate, feasible, and/or cost-effective test options to distinguish bacteria from wildlife, livestock, septic, pets, WWTP, boats, etc. Is it Microbial Source Tracking or is there a better method? What proportion of “positive” tests are due to non-fecal coliform bacteria? What are the hurdles to existing methods and realistic expectations of effectiveness?
5. How effective are public outreach and behavior change campaigns at reducing actions that contribute to stormwater pollution, and which specific strategies yield the greatest impact?

## Source Control-R4 Ideas:

1. What are the most effective approaches to source control for bacteria? In what situations do E&O, IDDE, and O&M activities most effectively address bacteria problems.
2. What do we know about the impacts of homeless camps on aquatic resources? Research water quality impacts with the goal of developing relationships with social services.
3. Research and compile examples of innovative stormwater management – e.g. –public private partnerships, watershed planning, use of technology tools, Strategic Asset Management. (White paper)Maintenance/Manual-New Ideas:
4. A white paper on how jurisdictions approach stormwater management on properties that do not drain to MS4s?  Are there local codes for stormwater management that apply? What non-stormwater regulations apply (e.g. UIC)?
5. In many areas of Western Washington, growth management resulted in slower new development and more redevelopment in already developed areas. To what extent does redevelopment—compared to new development—result in measurable improvements in stormwater management, and how do these improvements scale regionally? Conduct a study reviewing redevelopment projects (large to small) to quantify the improvements in flow and water quality control that resulted. Demonstrate how this information could be used to scale up expected benefits from redevelopment across the region.
6. Adapt TAPE’s definition of qualifying storm conditions to EWA climatic conditions so that more treatment devices could be considered for approved use in drier climates.

## Maintenance/Manual-R4 Ideas:

1. What is the minimum maintenance frequency for bioretention required to achieve full benefits of the facilities? Build on the previous SAM work on hydrologic performance of bioretention facilities ([SAM Fact Sheet #33](https://apps.ecology.wa.gov/publications/documents/2510030.pdf)).
2. What is the range of options to address spills on permeable pavement, and what are the most effective and lower cost methods?
3. Develop or modify a model to predict catch basin accumulation for predicting maintenance frequencies.
4. Research related to adaptations for the Stormwater Management Manuals; e.g., maintenance needs for new GULD/TAPE BMP’s, vetting feasibility of new BMP design screening methods.

## BMP Effectiveness- New Ideas:

1. Assess effectiveness in terms of both cost and pollution reduction, of street waste disposal procedures in [Appendix 6](https://fortress.wa.gov/ecy/ezshare/wq/permits/MS4_2024_App6_Final.pdf) . In particular, assess effectiveness of discharging liquids removed from the street to stormwater collection systems while sweeping during rain events.
2. Synthesize current understanding of how contaminants of emerging concern (CECs) behave within existing BMPs, focusing on mechanisms like sorption, degradation, transformation, and plant uptake. Include the implications for BMP design and soil reuse. Identify opportunities or challenges for reuse and disposal of spent media. Consider consulting contaminants listed in the [CEC Prioritization Report](https://pspwa.app.box.com/s/0luxyi979sz3d9cx90ovlr4ot6axqwk8/file/854990799970) published by the Puget Sound Ecosystem Monitoring Program (PSEMP) Toxics Work Group.

Determine biochar specification that produce the best water quality treatment. Consider that feedstock type, pyrolysis temperature, particle size, and post-processing treatments can influence biochar's physical and chemical properties and thus, its effectiveness in treating contaminants such as nutrients, metals, hydrocarbons, PFAS and 6PPDQ.

1. Collect data and evaluate the potential for PFAS migration to groundwater via infiltration BMPs and Underground Injection Control (UIC) wells, particularly in areas with vulnerable aquifers or drinking water sources
2. Determine the percent removal rate of TSS for a few typical Eastern Washington catch basin designs to identify and demonstrate which catch basin designs qualify as "pre-treatment" BMPs. Consider building on previous SAM study on catch basin maintenance ([SAM Fact Sheet #15](https://www.ezview.wa.gov/Portals/_1962/Documents/SAM/FS%23015%20WesternWA_CatchBasinInspection_MaintenanceReview.pdf))

## BMP Effectiveness-R4 Ideas:

1. Study existing BMPs (gray or green) to verify capture or treatment of 6PPDQ; e.g. solids and dissolved constituents removal.
2. Create a matrix comparing the effectiveness, costs, constructability, and maintainability of BMPs.
3. Quantify the habitat and other benefits and reduced O&M provided by mature vegetation in stormwater ponds. Are we still getting the pollutant removal? What are the tradeoffs?
4. A study that identifies appropriate BMPs for managing polluted pressure washing runoff and how to use them effectively in the variable situations that you find at different sites to better establish regional compliance consistency for both regulators and contractors.