

NTAID	NTATitle	Description	OwnerOrg	LocalType	Soundwide	SnoStilly
2018-0811	Protect and Restore Habitat: Enhance Family Forest Fish Passage Program (FFFPP)	<p>This NTA seeks funding for FFFPP at \$5M for 2 FTEs. This will result in correction of an estimated 44 fish passage barriers, opening an estimated 101 miles of stream habitat.</p> <p>FFFPP is voluntary and allows small forest landowners to sign up to eliminate fish passage barriers on their road crossings with financial assistance from the program. FFFPP is uniquely focused on private lands which are often not inventoried by resource agencies and tend to coincide with some of the most productive salmon habitat within watersheds. As such, FFFPP is closely tied to the shared regional priority of implementing prioritized structural barrier removals for fish passage. This cost-share program funds 75-100% of eligible fish passage barrier removal expenses. The program was developed to provide regulatory and monetary relief to small forest landowners complying with the forest practices rule requirement to make all roads crossing fish-bearing streams passable.</p>	Department of Natural Resources		1	
2018-0085	Green Shores for Home (GSH) Phase II - Implementation Phase	<p>This proposal implements Green Shores for Homes (GSH), a voluntary, incentive-based program by providing technical guidance to marine shoreline homeowners, contractors and jurisdictions to develop shore friendly projects. This incentive-based program is identified in SA 3.1 GSH will work with at least two jurisdictions developing a GSH credit framework to help with the review process of shoreline projects. Permit expediting will be tested for GSH certified projects that have been reviewed by independent third-party verifiers based on the technical elements found in the GSH Rating Guide. The effectiveness of the program will be determined by the number of jurisdictions adopting the approach. The GSH rating guide, designed by experts in the field, is consistent with the WDFW Marine Shoreline Design Guidelines and addresses issues associated with impacts from sea level rise.</p>	Washington Sea Grant	Non site-specific	1	
2018-0090	Hydrologic performance monitoring of rain gardens	<p>Relatively low-cost devices would be installed at many rain gardens to detect when and for how long bypass/overflow occurs at a rain garden. We would use nearby rain gage data to evaluate storm depth/intensity that caused a bypass and would use a simple hydrologic model in conjunction with the rain data to determine how much water is infiltrating at a rain garden. Performance would be tracked to see if bypass occurs during smaller, less intense rain events over time. The monitoring device is solar-powered and telemetered so won't require frequent site visits. Additional sensors could detect when water is flowing into the rain garden and/or measure duration of inundation at minimal cost.</p> <p>Organizations expressing interest in this this NTA include: Stewardship Partners (Aaron Clark), WSU (Ani Jayakaran), City of Puyallup (Joy Rodriguez), Kitsap County (Eva Crim), City of Kirkland (Jenny Gaus), RainWise (John Phillips) and South Central Action Area Caucus Group (Gretchen Muller).</p>	Aspect Consulting	Non site-specific	1	
2018-0103	Regional Critical Area Mapping and Data Equity Project	<p>This project seeks to:</p> <p>1) establish common critical area definitions where disparity exists, and 2) create a platform by which all local general government jurisdictions have access to common data expectations and standards and standards without the sole responsibility of that expense resting on that jurisdiction.</p>	Skagit River System Cooperative	Non site-specific	1	
2018-0107	Watershed Funding Strategies	<p>This project will work to explore the feasibility and validity of multiple funding concepts that work to support ongoing conservation and education efforts being advanced through the Action Agenda. This project will emphasize local watershed based mechanisms that target the greatest pressures on conservation priorities. Taxing authorities will be examined for multiple jurisdictions and recommendations developed for consideration by the PSP funding committee for eventual submission to key legislative committee's for consideration.</p>	Skagit River System Cooperative	Non site-specific	1	

2018-0124	Stormwater threats and clean water solutions for Puget Sound salmonids - Phase 2	Stormwater runoff has become the foremost toxic threat to salmon in the Puget Sound. Research has shown that non-point source pollution reduces coho survival across all freshwater life stages, from embryos to adults. Scientific information on stormwater hazards is critically needed to reduce these risks and promote salmon recovery at all scales, from improved survival of individuals to enhanced productivity of wild populations. The proposed research will build off previous work to assess the impacts of stormwater on Pacific salmonids and their habitats in urban and urbanizing watersheds of Puget Sound. This project will determine the extent to which ongoing changes in human population growth, coastal development, land cover change, climate change, stormwater runoff, and degraded water quality may undermine efforts to effectively conserve and recover salmon. The project will also identify solutions-oriented strategies to mitigate runoff and promote ecological resiliency in Puget Sound.	US Fish and Wildlife Service	Non site-specific	1	
2018-0128	Coordination of investments to support riparian protection and recovery at the reach scale throughout Puget Sound.	The Puget Sound Federal Task Force Regional Leaders and WA State Leaders have agreed to convene a work group and steering committee to develop strategies for coordinating investments and regulatory alignment to support reach scale riparian protection and restoration. The work group is an outgrowth of EPA, NRCS and NOAA coordination beginning in 2016 to fund and support riparian protection and restoration at the reach scale. EPA is currently piloting this approach with WA Department of Ecology in eight reaches throughout Puget Sound and will chair the work group.	US EPA	Non site-specific	1	
2018-0142	Protection and Restoration of Shoreline Process: Training for Shoreline Planners and Contractors	Coastal planners, contractors, and consultants require training about soft shore techniques. We propose to assess the learning needs of these audiences, develop a targeted training plan, and deliver an initial set of courses consistent with recommendations from the Shoreline Armoring Implementation Strategy Narrative 3.5. Courses will build upon those currently offered by the Coastal Training Program (CTP) and Washington Fish and Wildlife (WDFW) about Marine Shoreline Design Guidelines. Content will be based on existing and new case studies of local "soft shore" projects. An advisory committee consisting of agency representatives from WDFW, WDOE, the Coastal Training Program, contractors, shoreline planners, ecologists, and others will guide the development of the needs assessment and training plan. A minimum of two new courses for shoreline planners will be offered through the CTP and a minimum of two new courses for contractors will be offered through an appropriate training program.	Washington Sea Grant	Non site-specific	1	
2018-0159	Regional Prioritization for Conservation of Working Lands	This NTA proposes to build upon multiple recent efforts at the local or multi-county level to prioritize agricultural/working lands for conservation on a regional scale. Efforts and tools already developed will be compiled and incorporated into a regional prioritization tool to help guide future investments of public funds. This regional scale effort would be made available to assist conservation districts, land trusts, counties, and others with agricultural strategies and targeting incentive programs. The WSCC Office of Farmland Preservation will convene stakeholders (working with UW) to build upon recent work in this area to identify PS working lands at greatest risk of conversion utilizing current GIS data analysis methods. The results will be an effective tool in assessing risk of agricultural lands across the Puget Sound and will allow limited available resources to be focused on conservation of the highest value and at risk Ag lands.	State Conservation Commission	Non site-specific	1	
2018-0160	Regional Livestock Waste Management Innovations for Shellfish	Livestock waste has economic value that, if unlocked, will reward proper nutrient management practices that will protect and enhance the health of shellfish beds in watersheds with dairy and livestock operations with special focus on dairies in Whatcom, Skagit and Snohomish Counties. This NTA will work to support and build upon current efforts to prove out burgeoning technologies around processing of livestock waste to expand voluntary producer adoption and implementation of proven new technologies region-wide to more efficiently, effectively, and economically address bacterial pollution from agricultural livestock operations. Deliverables under this NTA may include regional education and outreach about new technology opportunities for managing livestock waste, incentives for adoption and implementation of new technologies, and follow up implementation monitoring of installed practices to inform adaptive management actions.	State Conservation Commission	Non site-specific	1	

2018-0163	Puget Sound Estuary Restoration Design Guidelines and Technical Tools	ESRP and other Puget Sound partner organizations have been working to advance science and understanding of estuary restoration through efforts like our ESRP Learning Program. ESRP will work with partner organizations to assemble best available science, technical design reports, and lessons learned from large scale estuary restoration projects (Qwuloolt, Smith Island, Fir Island Farms, etc) to produce new web-based and print BMP design guidelines, technical training modules, and project sponsor support information that advances the best and highest quality and efficient estuary restoration projects for the future. ESRP will work with our partners to create new technical trainings and materials that will support multi-benefit estuary restoration project implementation. Information and materials will be developed by first conducting an assessment of the needs of local estuary restoration project sponsors, the focus audience for this new information.	Department of Fish and Wildlife	Non site-specific	1	
2018-0165	GSI at scale: Maintenance and inspection of GSI installations in the Puget Sound	There is now considerable experience in Western Washington implementing green stormwater infrastructure (GSI) practices. It is now critical that we begin to address whether GSI installations are maintained and work as designed. In this proposed NTA, the team (an economist and hydrologist) propose a series of activities that will inform policy actions in the next decade of GSI deployment. These include a) surveys of homeowners on GSI maintenance costs; b) cataloging current inspection protocols used by local implementing agencies in the Puget Sound as well as their costs; c) development of a feasible and scientifically-grounded monitoring and inspections protocol; d) assessing the effect of poor maintenance on GSI through experimental manipulation at the WSU Puyallup experimental plots; and e) modeling studies that relax the assumption that all GSI installations work as intended and test how valuable is each GSI practice with respect to its position in the watershed.	Washington State University Extension	Non site-specific	1	
2018-0183	Completing and Maintaining Sound-wide Shore Armor Mapping	This proposed NTA includes updating shore armor mapping incrementally, with priority for shores where existing mapping is low resolution, of low (spatial) accuracy, and data is old (dating back as far as 1999). New armor mapping would be conducted by boat using GPS with a minimum mapping unit of 20 ft following mapping methods developed by CGS for ESRP (CGS 2016). This protocol was recently applied to over 350 miles of Puget Sound shore and includes data on armor tidal elevation and condition, with greatly improved spatial accuracy compared to all older data. Each year, coarse/old data would be updated with the objective of having a fully updated shore armor dataset by 2022. Annual updates would include changes to WDFW's HPA data base ; so the data would be in agreement and accurately reflect on-the-ground conditions. This work addresses the Armor IS, is critical for restoration planning, management and tracking. Coordination with regional entities and WDFW is in progress.	Coastal Geologic Services, Inc.	Non site-specific	1	
2018-0204	Assess impacts and develop strategies to reduce impacts from forestry on freshwater quality	The Freshwater PSP Vital Sign protection target for the B-IBI indicator is "100 percent of Puget Sound lowland stream drainage areas ranked as excellent retain excellent scores for the BIBI". B-IBI sites in forested basins are typically among the highest scoring sites in Puget Sound, many of which have been identified as prime candidates for protection. Understanding how forest management affects freshwater quality and the B-IBI indicator is critical to develop and implement protection plans. King County will use forest harvest records from throughout Puget Sound to retrospectively assess how forest management in this region may impact B-IBI scores. Results of the analysis will guide development of the B-IBI implementation strategy for working lands.	King County	Non site-specific	1	

2018-0205	Puget Sound Shore Stewards	<p>The WSU Shore Stewards program protects and improves water quality and shoreline function by educating and motivating shoreline property owners to make sound home and landscape management decisions. This social marketing based program provides an easy point-of-entry and trusted resources for shoreline landowners who want to be better stewards of their shoreline. Homeowners join the program by agreeing to observe 10 guidelines for shoreline living. We support their success by focusing on behavior change messaging through social media outreach, e-newsletters, site visits, direct mailings, trusted agent (Realtor) training, workshops and events. Leveraging the capacity of partner organizations we connect property owners with local programs and resources, emphasizing protecting shoreline processes and preventing bacterial pollution. Currently there are 1,700 Shore Stewards in 5 counties, this enhancement and expansion will significantly increase program enrollment and impact.</p>	Washington State University Extension	Non site-specific	1	
2018-0210	Bacteria Source Identification and Reduction Program	<p>Better Coordination: Existing PIC and FC TMDL efforts will be better coordinated among multiple agencies (King County, Cities, State, non-profits) to increase the probability of pollution sources being both identified and successfully eliminated, to achieve goals of cleaner natural waters.</p> <p>New Efforts: Targeted education & outreach to citizens in specific PIC and FC TMDL areas, for better septic system and landscape practices to decrease release of pathogens, detergents, excessive nutrients and other pollutants to surface waters and groundwater.</p> <p>Targeted landscape-scale inspections, leading to site-specific inspections and citizen contacts, by teams consisting of multiple agency and non-profit staff, to identify possible pollution sources (poor agricultural practices, possible failing septic systems). Technical and financial assistance to be available to citizens, for septic repairs and installations and better agricultural BMPs, such as buffer fencing and manure managing.</p>	King County	Non site-specific	1	
2018-0211	SavvySeptic Program	<p>This project would more effectively identify and reduce pollution sources from failing or bootlegged septic systems. Discharges from such systems are currently deleteriously impacting fresh and marine waters.</p> <p>SavvySeptic King County will be run in selected parts of FC TMDL and prohibited shellfish harvest areas. Educational events will be planned and held at the neighborhood level; invitations mailed to homes. Full packets describing individual septic system (az-bilts, maintenance instructions and agreements) would be provided to individual homeowners attending each educational event.</p> <p>Financial assistance would be available to homeowners who need to repair or replace their septic systems (currently Craft3 administers low-interest septic loans; possible other grants would be explored for some repair work.)</p> <p>Citizens empowered with more awareness of and knowledge about maintaining their septic systems would increase cleaner water flows to groundwater and surface waters.</p>	King County	Non site-specific	1	

2018-0212	Enhanced Stormwater System Maintenance for Mitigation	<p>The City of Tacoma made system cleaning a standard procedure after end of pipe stormwater monitoring results showed significant improvement to contaminant levels after system cleaning occurs. Tacoma prioritizes areas to receive enhanced maintenance according to system age, sediment levels and other factors so that the greatest amount of sediment and associated pollutants are collected and thus not allowed to enter the receiving waters. Approximately 100,000 Inft of pipe will be cleaned and inspected for a total of \$350,000.</p> <p>System cleaning will be accomplished by scouring the pipe and vactoring the sediment. Each pipe cleaned will be plugged preventing wash water and sediment from entering the receiving waters. The amount of sediment removed will be tracked and properly disposed of. Tacoma will complete periodic TV inspection of cleaned storm line pipe to confirm cleaning of the pipe.</p>	City of Tacoma	Non site-specific	1	
2018-0220	Assessment of Bluff Recession Rates in Puget Sound: Implications for the Prioritization and Design of Restoration Projects (Phase 2)	<p>Coastal bluffs are the most prevalent coastal landform type in the Puget Sound region, totaling over 1,000 miles shoreline. CGS recently measured and analyzed long-term coastal bluff recession rates from 185 bluffs to understand the range and dominant drivers of recession. This study includes measuring more bluff recession rates, integrating new data, comparing recession rates from armored and unarmored bluffs, and a decadal study of a sub-sample of bluffs at higher resolution. The higher resolution analysis will explore how recession rates have changed over the last century and how much of that change is associated with specific drivers. This element would likely entail collaboration with USGS. Robust statistical analysis will be applied to explain the variability in bluff recession at the regional scale and better predict bluff recession rates. Results will enable better management of Puget Sound coastal bluffs and understanding of the impacts of armor of bluff recession.</p>	Coastal Geologic Services, Inc.	Non site-specific	1	
2018-0227	Developing a BMP Manual for Streamside Landowners	<p>The proposed action would bring together regional partners throughout Puget Sound at various levels to develop a riparian BMP manual for landowners and contractors, such as landscapers. This final product would be similar to the successful guide that WDFW developed for shoreline landowners. With the collaborative development of this riparian manual, partners at all levels throughout Puget Sound could utilize the product in site visits, at outreach events, and in other forms. The end result will be an increased understanding of best management practices specific to native vegetation, stormwater management, and habitat protection. Furthermore, this action will result in an increased understanding of and compliance with regulations and permits.</p> <p>An essential component of this effort is to outreach to contractors and other trusted messengers, such as realtors, who have a hand in the decisions and actions landowners take in managing their lands and home.</p>	Hood Canal Salmon Enhancement Group	Non site-specific	1	
2018-0233	Non-Fish Stream Crossing Database Addressing Climate Change	<p>Climate change is likely to create more frequent and extreme precipitation events and the impacts will put a strain on our streams, stormwater systems, and infrastructure. DNR anticipates that only 75% of the non-fish stream culverts are captured in our existing culvert database. By evaluating all of our culverts and planning replacements with increased capacity to improve stream function, it will aid in providing cleaner water for Puget Sound. DNR will redesign the existing database to include additional information on non-fish stream culverts. We will review existing guidelines (NTA 2018-0234) to determine the additional parameters to be evaluated (field/office) and tracked, and use the synthetic stream layer from LiDAR to conduct a pilot project. The pilot project will allow us to calculate the total impact to budget and resources to complete this project for the entire Puget Sound Basin. Ultimately, we will complete the inventory and evaluations Puget Sound wide.</p>	Department of Natural Resources	Non site-specific	1	

2018-0234	Update BMPs and guidelines addressing climate change and sediment delivery.	<p>DNR needs to update BMPs and guidelines because most currently used information is dated and limited in scope; not accounting for affects due to higher frequency and intensity of storm events. These updated BMPs will have more focus on non-fish streams and their contribution to salmon habitat and overall stream ecology.</p> <p>DNR will research and review, new and advanced methodologies to accommodate impacts from climate change and effects of sedimentation at stream crossings in the forested environment. The research and review process could include working with WDFW and Ecology to incorporate progress and new ideas from those agencies.</p> <p>DNR will work with data collected in NTA 2018-0233 to develop BMPs based on research and observations from our own data. After the guidelines, recommendations, and BMPs are developed, DNR will publish them in the DNR Forest Roads Guidebook and provide training to DNR engineers.</p>	Department of Natural Resources	Non site-specific	1	
2018-0242	Puget Sound Forage Fish Habitat Characterization	<p>Objective 1: Washington Administrative Code protects documented Sand Lance spawning habitat above +5' MLLW, and WDFW has used beach surveys to document this habitat since the 1980's. Recently WDFW has developed new sample processing methods that are more efficient at detecting the presence of eggs. We will use these new methods and a systematic sampling approach to update and improve Sand Lance spawning habitat maps and information.</p> <p>Objective 2: Sand Lance are unique among Puget Sound forage fish because they burrow in sand to conserve energy and to avoid predators. Recent surveys by WDFW have found that Sand Lance burrow in sediment at elevations of up to +2' MLLW, and that these discrete areas of habitat appear to be used consistently over decades. We will survey nearshore areas to describe Sand Lance burrowing habitat so that managers can make informed decisions about activities that may impact this habitat and whether additional protections are warranted.</p>	Department of Fish and Wildlife	Non site-specific	1	
2018-0243	Development of Chemical Indicators to Detect, Track and Assess Treatment of Novel and Emerging Toxic Stormwater Pollutants	<p>Currently, stormwater treatment performance (e.g. TAPE protocols) and optimization is evaluated using suspended solids, metals, PAHs, nutrients, and pathogens. While effective as a first pass indicator of water quality, issues such as coho pre-spawn mortality, genotoxicity, and impaired immune function (metrics of biological health) indicate that other organic pollutants in stormwater are driving biological impairments. Here, we propose to develop a more comprehensive suite of organic pollutants and toxicants (a broader "measuring stick") to represent water quality in urban stormwater. We then propose to survey different systems for their occurrence and compare their removal in a variety of technologies to evaluate treatment performance. This effort, similar to the use of organic pollutant indicators for municipal wastewater treatment, will allow for treatment optimization and the selection of treatment technologies most likely to correlate to reduction in biological impairment.</p>	University of Washington	Non site-specific	1	
2018-0265	Implement incentives to encourage soft-shore protection techniques on residential lots by removing permitting barriers for marine soft-shore projects.	<p>Federal, state and local regulatory agencies have identified conflicting regulatory authorities and policies for shoreline protection which has created regulatory disincentives for marine shoreline property owners who may otherwise be interested in soft-shore protection approaches. This NTA will implement recommendations from the Puget Sound Shorelines Workgroup and remove disincentives to permitting soft-shore protection projects. The desired outcome is to improve regulatory mechanisms and coordination among regulating entities to increase incentives to soft armoring approaches and decrease the use of hard armoring.</p> <p>Actions include:</p> <ul style="list-style-type: none"> Local, state, and federal governments facilitate and support inter- and intra-agency communication and collaboration. Develop a streamlined permitting process to encourage landowners to use soft shore techniques for all new and replacement armoring where appropriate. Regulatory Agencies coordinate permit applications and reviews when feasible. 	Department of Fish and Wildlife	Non site-specific	1	

2018-0266	Development of a Revolving Loan Fund to provide financial incentive for removal or modification of shoreline armoring on private property	<p>A Revolving Loan Fund (RLF) uses seed money to capitalize a managed fund that is used to make loans. This fund is replenished as loans are repaid, resulting in ongoing financing for new loans and program administration. The proposed program will be modeled after Ecology's Regional On-Site Sewage System Loan Program (established 2016), as well as shoreline construction RLFs in Maryland and Virginia.</p> <p>Phase 1. Feasibility (this proposal) Convene a steering and/or advisory committee(s) to guide a feasibility assessment involving: (1) Investigation of homeowner interest in a loan program (2) Financing analysis, including 10-year capitalization needs and source(s) of funding (3) Determination of appropriate entity to administer the program, who would then apply for funding</p> <p>Phase 2. Implementation (NTA owner shifts to entity identified during feasibility phase) (1) Develop program guidelines and eligibility criteria (2) Request proposals for and contract with a loan originator/servicer</p>	University of Washington	Non site-specific	1	
2018-0279	Puget Sound Stream Thermalscape	Spatially continuous predictions of stream temperatures may be used by managers to understand the occurrence and distribution of Chinook salmon, steelhead, and other aquatic biota upon which they depend to maximize restoration efforts. This representation of stream temperatures, termed a thermalscape, will be developed for streams draining to Puget Sound by fitting a statistical model to observed temperatures. The proposed model, a spatial stream network (SSN) model, will account for the influence of the drainage network on stream temperature predictions and incorporate predictor variables hypothesized to influence stream temperatures. This model will augment existing regional SSN models by (1) incorporating additional temperature observations by local, state, and federal agencies and developing Puget Sound-specific predictor variables, (2) improving model predictive performance, and (3) allowing assessment of changes in climate and/or land use in Puget Sound on stream temperatures.	US Geological Survey	Non site-specific	1	
2018-0293	Building Green Cities, Phase 2	<p>To test effectiveness of incentives to include LID treatments in urban center redevelopment projects:</p> <ol style="list-style-type: none"> 1. Identify and work with three cities with designated regional growth centers (PSRC 2040) that have: <ol style="list-style-type: none"> a. adopted regulations that incorporate LID, b. differing runoff and flow control issues, and c. willing developers 2. Monitor and assess the results 3. Share results with other Puget Sound cities and counties 4. Write addendum to Building Green Cities Guidance document to include findings of monitoring. 	Department of Commerce	Non site-specific	1	
2018-0299	Characterizing Wetland and Undeveloped Upland Juxtaposition to Identify and Prioritize Ecological Important Areas	GIS will be used to determine the area, perimeter and connectivity of undeveloped forest habitat around wetlands from current high-resolution aerial photographs. These parameters control population size in the wetland-breeding, multi-kilometer-migrating Northern Red-legged Frog (NRLF), enabling scoring wetlands across a continuous quality gradient. Using that gradient also preserves biodiversity because NRLFs are an umbrella species for wetland-breeding amphibians and they have high aquatic habitat use overlap seasonally with juvenile Coho salmon. This effort can directly contribute to evaluating changes in UGAs and CAOs; cities, counties and Ecology are potential partners. The effort applies to wetland-upland interfaces Puget Sound region-wide; it contributes directly Strategic Initiative for Habitat, the Land Cover and Development Vital Sign (VS), and Regional Priority LCLD1 under that VS to identify Ecologically Important Areas.	Department of Ecology	Non site-specific	1	

2018-0303	BMPs for stormwater outfalls	This project involves developing a systematic inventory of stormwater outfalls to natural water bodies to determine opportunities for water quality and flow control benefits. This categorized inventory of outfalls will enable prioritization of outfalls to rectify erosive outfall, remove outfalls to increase infiltration through dispersion/wetlands/stream buffers, and seek out additional water quality and flow control scenarios associated with outfalls.	King County	Non site-specific	1	
2018-0307	Enhanced maintenance for stormwater mitigation and sediment removal  sweeping and stormwater system cleaning (pipes and ditches)	This project will develop a program for King County to coordinate with regional jurisdictions to perform enhanced maintenance actions to address Legacy load (sediment, and associated contaminants) removal in Puget Sound basin and remove ##### (initial research underway to establish a realistic target) tons of sediment from the stormwater systems in Puget Sound basin.	King County	Non site-specific	1	
2018-0308	Watershed Analysis for City of Tacoma	Develop a Watershed Plan to identify/prioritize stormwater and LID programs and infrastructure to provide important environmental/health benefits, limit runoff and pollution and increase infiltration of rainwater in Tacoma's Watershed by prioritizing programs/infrastructure in locations that are most important to the protection or restoration of receiving waters. The watershed characterization will be a City-wide Prioritization Model based on Geospatial Data. This effort will: <ul style="list-style-type: none"> - Meet/exceed environmental regulations to protect the well-being of our community - Generate a base of scientific information that can be used for evaluating the relative rehabilitation potential of the City's Watersheds - Guide activities to ensure faster healthier watersheds - Further align actions in a regional framework, City policies, sustainability principles, and environmental regulations- - Guide the use of City financial resources to achieve the greatest environmental benefits 	City of Tacoma	Non site-specific	1	
2018-0309	Supporting tree planting through Surface Water Management (SWM) Fees	Existing stormwater pollution in conjunction with a growing population and changes in rainfall patterns due to climate change impacts, will potentially increase the negative impacts of stormwater pollution. Planting trees can reduce many negative impacts of surface water runoff such as; intercepting precipitation on hard surfaces, reducing soil erosion, and increased infiltration and storage of stormwater. Studies have shown that 100 mature trees can capture 139,000 gallons of rainwater each year. Developing a program allowing SWM fees to pay for a severely underfunded asset will result in multiple benefits, and align stormwater management with human health benefits, salmon recovery strategies, reduced urban heat island effect, climate resiliency, carbon sequestration, and increased tree canopy. Tree planting sites will be determined looking at GIS data and all tree planting will be tracked through an established GIS based collector application.	King County	Non site-specific	1	
2018-0311	Depaving King County	Establish an outreach program to advertise funding for depaving projects and work closely with Depave Puget Sound and King County cities to find proposed sites. Work closely with the community to understand needs such as; community gardens, green space, shade, etc. Contract the depaving and instillation of new green space. Track progress through an annual report and measure success by the number of projects completed each year and the feedback from the communities benefitting from the projects. Depaving program will target areas that deal with flooding, polluted waterways, urban heat island, and other issues that can be mitigated through removing impervious surfaces. The entire program will be King County SWM funded.	King County	Non site-specific	1	
2018-0312	Flow Monitoring in MS4	The NPDES Permit requires King County to prohibit non-stormwater discharges through the MS4 and implement controls to reduce discharge into surrounding waterways. Field investigations of flow and turbidity require an intense amount of staff time and can sometimes have limited success at detecting transient flows. In addition, modeled catchments for flow and turbidity may be limited in accuracy, therefore, the installation of flow monitoring equipment into the MS4 is an efficient way at collecting accurate flow and turbidity data.	King County	Non site-specific	1	
2018-0315	Regional Geotechnical Data to Promote Green Infrastructure	Expand the Regional Urban Growth Center Tacoma Mall EIS and Develop Standards for obtaining Geotechnical Information to Promote use of green stormwater infrastructure. Obtain city-wide geotechnical information is a standardized geospatial data format. Develop a publically available platform for engineers and designers to use in design of green infrastructure.	City of Tacoma	Non site-specific	1	

2018-0318	Contractor Training for Hydraulic Project Compliance	We are proposing to develop and conduct marine contractor training throughout Puget Sound in basic construction provisions to protect fish life. We also envision more advanced training (e.g. fish isolation and bypass methods) for specific project types. Project types for training would be identified as the program is developed, gain partner input, and we learn what training others are providing. WDFW would develop the training objectives and curriculum to ensure HPA statutes and rules are fully covered. We would like to work with partners who would develop and deliver training. Manner of recognition TBD, but the intent is to provide incentives for contractors to take the training that, in turn, attracts project proponents to certified contractors. This NTA would be closely linked to the compliance monitoring NTA as a way to recruit contractors and reinforce corrections prescribed by compliance inspectors.	Department of Fish and Wildlife	Non site-specific	1	
2018-0319	Habitat Value of Large Wood in Soft Shore Techniques	Soft shore techniques are encouraged as a preferred alternative to armoring in Puget Sound. For example, the Puget Sound Partnership prioritizes the use of techniques such as large wood placement, and evaluating these projects is emphasized in the Shoreline Armoring Implementation Strategy. With more information on habitat value we could better design the use of wood placements, often anchored logs. This information is necessary to fulfill goals, as current implementation is below the 2020 target, and progress is limited by insufficient data, slowing implementation. Methods for success to achieve our objective will include monitoring of invertebrates, fish, birds, and sediments at 10 or more sites in Puget Sound with large wood placement. Our proposal aligns with Regional Priority SA3.4 by evaluating implemented soft shore projects to improve adaptive management, and this information can be used to better design projects in the future.	University of Washington	Non site-specific	1	
2018-0327	Puget Sound Critical Areas Monitoring and Adaptive Management Program	Local governments need a feedback loop to help determine whether goals of critical areas protection in Puget Sound are being met, and if the goals are not being met, how to improve the process. Many jurisdictions are interested in building adaptive management programs but lack resources. The Washington State Departments of Commerce, Ecology, and Fish and Wildlife would provide technical assistance and resources to cities and counties to develop or enhance monitoring and adaptive management of critical areas permit implementation and effectiveness. The program would use a new chapter in the Washington State Department of Commerce Critical Areas Handbook developed with Ecology and WDFW. State resources would include: Grants to local government; Direct state technical assistance and training for local governments; and Provision of state technical tools for tracking permit effectiveness and training to use those tools, such as High Resolution Change Detection.	Department of Commerce	Non site-specific	1	
2018-0339	Evaluation of Retrofit Funding Strategies	Funding is critically lacking relative to the need for stormwater retrofitting of unmitigated developed surfaces in KC. Mitigation of these unmitigated developed surfaces represent a huge challenge and opportunity to improve and recover stream systems that have been degraded by increased flows and pollutants from development. Strategies will be surveyed and evaluated for feasibility in meeting goals for funding retrofit efforts.	King County	Non site-specific	1	
2018-0352	Technical Leadership for Developing an Implementation Strategy for Summer Stream Flows	Hydrologists from the USGS will provide technical leadership and assistance in developing an Implementation Strategy for Summer Stream Flows. Contributions will come from our combined knowledge and expertise gained through multiple recent and on-going assessments of groundwater availability, groundwater use, and low flows in streams and rivers, including preliminary results from the 2016-18 NTA 2016-0103 Groundwater Availability for Summer Low Flows. In particular, we will collaborate with LIO and tribal partners, SI Leads, the EPA, and others to propose and evaluate elements of an Implementation Strategy that can minimize the impacts of future stressors on summer stream flows, and can effectively mitigate both current and potential future impacts.	US Geological Service	Non site-specific	1	

2018-0354	Effect of a neonicotinoid mixture on the aquatic invertebrate community	The experiment will be run in outdoor. An aquatic community will be created in late spring, by adding well water, dry leaf litter and pond water (as a source of phytoplankton and zooplankton). Insects will be allowed to naturally colonise the microcosms. However, common invertebrate predators, such as, water bugs, backswimmers, water boatmen, and dragonfly larvae, collected from nearby ponds, will be added into the pools. One week after the addition of the predators in the system, three neonicotinoid insecticides, plus their mixture will be applied at concentrations measured in wetlands adjacent to agricultural fields. The community will be sampled one day before treatment, two days, 7 days and then every 2 weeks until the end of the experiment. On each sampling date, chlorophyll a concentration and temperature, pH, conductivity, and dissolved oxygen will also be monitored. The experiment will run until community recovery is observed in the treated pools.	Washington State University Extension	Non site-specific	1	
2018-0357	Puget Sound Integrated Coastal Inundation Modeling and Mapping	This NTA proposes sound-wide high-resolution coastal flood modeling of shorelines, deltas, and large coastal river systems in Puget Sound, building off the USGS CoSMoS (Coastal Storm Modeling System) (http://walrus.wr.usgs.gov/coastal_processes/cosmos/index.html) and a new USGS storm model developed for Whatcom, Skagit, and Island Counties that evaluates the potential combined impacts of future sea level rise, shoreline modifications, and hydrologic changes. The envisioned integrated coastal shoreline/river system/flood plain modeling system will evaluate the combined impacts of sea-level rise, storms, and river flooding. High-resolution coastal flood modeling can be used to simultaneously explore vulnerability, ecosystem restoration, and development, informing planners and decision-makers about these complex inter-related issues.	US Geological Survey	Non site-specific	1	
2018-0359	Groundwater Availability for Summer Low Flows	USGS will generate and compile monthly groundwater budget data and related hydrogeologic information for subbasins underlain by the ~7,200 sq-mi Regional Aquifer System of the Puget Sound lowlands. Data will be compiled or estimated using consistent approaches for approximately 36 subbasins (~2 per WRIA) that cover the lowlands, and will include groundwater recharge, use (withdrawals and consumptive use), discharge to streams and rivers, and discharge directly to Puget Sound. In addition, current surface-water withdrawals and streamflows will be compiled at a similar scale to allow a holistic comparison of water demands, summer low flows in streams, and groundwater availability in different hydrogeologic settings of Puget Sound. ♦We will capitalize on the wealth of existing expertise and information, including groundwater recharge modeling, streamflow hydrograph analysis, water-use and streamflow data, and WRIA-scale groundwater flow model results.	US Geological Survey	Non site-specific	1	1
2018-0365	Accelerate development and implementation of innovative water treatment technologies	The Aqualyst Accelerator program (launched in 2017) accelerates the pace and success of water technology development and solution implementation. Aqualyst was created through an EDA grant, but requires ongoing funding to maintain future operations. Aqualyst is an immersive, 14-week program for water technology companies, designed to catalyze their businesses and place their product in the market faster and more intelligently. The program caters specifically to each water technology company, providing resources and mentorship that is unique to their concept and needs. Our program serves as the hub, connecting innovators with exactly the right customers, funders, mentors etc. to support the research, pilot testing, and business development efforts needed to bring innovative water treatment technologies to market. The accelerator model is not new, but there are insufficient examples focused on water treatment specifically, particularly in the Pacific Northwest.	PureBlue	Non site-specific	1	

2018-0366	Development of a Washington State Stormwater Resources Library	<p>The project includes the planning, technical development, and initial population of a Stormwater Resources Library. The Library will serve as a streamlined system to collect, organize, and more efficiently share valuable stormwater tools, best practices, lessons, etc. being actively produced (but not efficiently shared) among the stormwater community. The system will also include a simple, searchable forum where users can discuss common issues, discuss Library content, and share solutions. Key functions of the Library are to:</p> <ul style="list-style-type: none"> --Bring the large volume of available stormwater resources together for easy identification, promotion, and access. --Provide a streamlined platform for sharing materials. --Facilitate both rapid search using advanced (multiple filter) key word searches of documents, and to allow for browsing of holdings by topic or document rating. --Encourage future sharing of new materials through easy uploading, downloading, and commenting on documents. 	PureBlue	Non site-specific	1	
2018-0373	Don't Drip and Drive : Vehicle Leaks Education and Behavior Change Program	<p>Don't Drip and Drive uses a social marketing approach to increase awareness and motivate car owners to get leaks fixed. Key strategies include:</p> <ul style="list-style-type: none"> ◆Partnership with auto repair shops to voluntarily offer free visual leak inspections and discount coupons for repairs. ◆Partnership with quick lube shops to conduct free leaks inspections during routine oil changes; notify customers, and provide campaign materials to encourage them to fix the leaks. ◆Free Auto leaks inspection workshops for vehicle owners held at technical training centers, given by trainers at that facility. ◆Leak Check events at public parking places where vehicle owners receive free mechanic consultations from credible third party mechanics and learn about the impacts and importance of fixing leaks. ◆Multi-media regional advertising to promote key messages and direct car owners to resource website. ◆Program Evaluation to determine success in shifting attitudes and changing behaviors. 	Department of Ecology	Non site-specific	1	
2018-0403	Municipal Stormwater Pollution Accountability Project	<p>Building on a successful phase 2 of this project, culminating in the release of "Nature's Scorecard" https://naturescorecard.com/ and the cooperative resolution of a legal action to enforce the Municipal Stormwater NPDES permit with Snohomish County, Puget Soundkeeper proposes to keep the momentum going and execute the additional work necessary to complete the project & achieve its goals. Methods for success for phase 3 will include: 1) Conduct outreach to community, partners & leaders to share results of "Nature's Scorecard", 2) Engage with municipalities identified as "green star leaders" to reinforce positive accountability, 3) Track impacts of "Nature's Scorecard" & resulting community advocacy on municipal progress, 4) Update "Nature's Scorecard" to reflect improvements & progress, 5) Conduct outreach & education to municipalities that are falling behind permit standards to bring them into compliance.</p>	Puget Soundkeeper Alliance	Non site-specific	1	

2018-0433	Implement a No Discharge Zone within Puget Sound	<p>This NTA proposes to do two things:</p> <p>a). Increase sewage pumpout options for commercial vessels in Puget Sound.</p> <p>b). Implement an integrated vessel sewage behavior change campaign to increase awareness and understanding about pollution problems caused by sewage, educate boaters about No Discharge Zone requirements and motivate them to comply with the rule.</p> <p>Methods</p> <p>Commercial Vessel pumpouts</p> <p>Establish a grant process for commercial vessel pumpouts.</p> <p>Issue and manage grants to install commercial vessel pumpouts.</p> <p>Behavior Change Campaign</p> <p>Update customizable educational and outreach materials/tools.</p> <p>Work with existing marina outreach and education programs to reach out to boaters.</p> <p>Implement a multi-media campaign to continue to heighten awareness and motivate boaters to use pumpout stations, and reinforce those who already do.</p> <p>Coordinate and manage funds to partners for their work.</p>	Department of Ecology	Non site-specific	1	
2018-0436	National Hydrography Dataset Update: Correct mapped stream locations as a first step in developing a decision framework and shared prioritization tool to coordinate plans and actions among agencies, across all levels of government, and the private sector.	<p>Identifying critical habitat is vital to stopping the decline of wild Chinook salmon. The first step is to correct the National Hydrography Dataset (NHD) using accurate spatial records. The NHD is the foundation for many strategic maps, including cataloguing fish distribution, but a significant proportion of Puget Sound streams are incorrectly mapped. WDFW is in a unique position to update the NHD, having 20+ years of stream survey documentation. Via GIS exercises we'll compile spatial data from ~1,435 miles of surveyed streams in the Puget Sound, and deliver that data to the NHD Hydrography Data Steward at Dept. of Ecology for publication. Then we'll develop an informational tool that entities can use to prioritize fish passage barrier corrections, to restore access to spawning/rearing habitat. Ideally this tool will be a collaborative platform, compiling many variables of interest (e.g. stormwater, species utilization, water quality, eDNA) to facilitate robust decision making.</p>	Department of Fish and Wildlife	Non site-specific	1	
2018-0440	Uncertainty Fellow - Addressing priority analysis gaps in support of the development and execution of Implementation Strategies	<p>The development and execution of Implementation Strategies for Puget Sound recovery is supported by a foundation of the best available science. Applicable reports, publications, and data are synthesized at the beginning of the development process, and key questions and uncertainties are recorded and evaluated throughout. The result is a selection of key uncertainties which are critical to the execution of the identified strategies. Some of these priorities are classified as "resolvable" indicating that they can be addressed with 1-2 weeks of concerted effort. However, these have heretofore been left unaddressed due to the lack of available effort. Under this NTA we propose to hire graduate students from UW for focused, short term evaluations of high-priority, resolvable uncertainties. Students will be selected so that their primary area of study aligns with the topic area of question at hand; work will be performed under the guidance of a senior faculty or staff advisor.</p>	University of Washington Tacoma	Non site-specific	1	
2018-0444	Measuring seasonality in nutrient cycling, organic-matter mineralization, alkalinity fluxes, and oxygen consumption rates in Puget Sound sediments.	<p>Puget Sound sediment cores and overlying water will be collected at 50 stations; incubated; and change over time in nutrient content, alkalinity, and dissolved oxygen levels will be measured to:</p> <ol style="list-style-type: none"> 1) Determine rates of nutrient cycling, organic-matter mineralization, alkalinity flux, and oxygen consumption at selected locations Puget Sound-wide. 2) Quantify spatial and seasonal variation of these rates Puget Sound-wide. 3) Provide spatial and temporal data to scientists developing the Salish Sea Model/Sediment Diagenesis Module for model output evaluation and refinement. 4) Determine the measurement error associated with data, and specify uncertainties inherent with the experimental approach. 5) Use empirical data and model output to inform the PS Nutrient Source Reduction Project and address and manage water quality and sediment parameters related to excess nutrient loading. 	Department of Ecology	Non site-specific	1	

2018-0445	Making a comprehensive set of stream biological metrics publically available.	<p>This NTA would create and document a public and comprehensive Washington database for reporting 391 biological metrics that describe stream health based on macroinvertebrate, periphyton, and fish/amphibian communities. These metrics would have easy access and display. They would be hard-coded for repeatability and calculation methods would be described in detail for transparency. This set of biological metrics would supplement the 10 metrics that are already reported by Puget Sound Stream Benthos.</p> <p>The U.S. EPA advocates monitoring based on multiple biological assemblages (invertebrates, periphyton, aquatic vertebrates) because they each respond differently to different stressors (e.g., eutrophication, metals pollution, elevated temperature, excessive sedimentation, or habitat simplification). Likewise, different metrics or combinations within each assemblage may have signature responses. Best management practices could thereby be more readily assessed for effectiveness.</p>	Department of Ecology	Non site-specific	1	
2018-0450	Puget Sound Watershed Continuous Nitrogen Monitoring	<p>This continuous nutrient data collection from these six river systems will give us a better understanding of watershed nutrient flux and yield to improve model performance and reduce uncertainty for watershed loadings in the Salish Sea Model. We are focused on major watersheds that can contribute overall significant loads, as well as rivers that may directly impact conservation or active restoration areas. In addition, collection of a complimentary suite of parameters at other established sites on a monthly basis, along with targeted sampling of those same parameters during peak flows will create the robust dataset needed to improve spatial and temporal characterization of nutrient loads. We also plan to outfit the same six continuous monitoring stations with ISCO samplers to more accurately characterize peak storm events with a full suite of related parameters, as well as to provide samples for quality control of the continuous data record.</p>	Department of Ecology	Non site-specific	1	
2018-0460	Novel and Emerging Contaminant Detection and Source Identification in Water, Fish and Shellfish	<p>Humans are discharging substantial loads of contaminants, including many poorly described chemicals, into receiving waters. Such chemicals can directly affect the health of exposed organisms, yet many emerging chemicals and their major sources remain unidentified, particularly for urban stormwaters. To better understand and mitigate major contaminant loadings to aquatic ecosystems, we propose to survey water, fish and shellfish samples from some key sites for the occurrence of novel and emerging contaminants, particularly those described elsewhere (SF Bay, SoCal Bight) but not reported in Puget Sound. Additionally, via detection of co-contaminants with non-target high resolution mass spectrometry, we believe that we can also identify and track chemical signatures specific to different sources. Thus, for both known and novel detections, we likely can identify which sources contribute these chemicals to the aquatic environment. Such efforts contribute to effective chemical management.</p>	University of Washington Tacoma	Non site-specific	1	
2018-0464	Identification of a marker of fecal bacterial contamination from raccoons.	<p>Regional pollution identification and correction (PIC) programs are challenged with identifying sources of bacterial contamination impacting beaches and shellfish beds. It is not uncommon to have a mix of potential sources at a given site including failing septic systems, agricultural runoff, pet waste, and wildlife. Traditional tools are non-specific and often do not inform on sources. Advanced methods (e.g., chemical and/or genetic markers) can provide some information to guide source correction efforts. Under this NTA we propose to develop a tool specific to bacterial contamination from raccoons; one does not currently exist.</p>	University of Washington Tacoma	Non site-specific	1	

2018-0465	Chemical Action Plans for Endocrine Disrupting Chemicals (EDCs)	<p>In the last two decades there has been a growing awareness of the possible adverse effects in humans and wildlife from exposure to chemicals that can interfere with the endocrine system. These effects can include developmental malformations, interference with reproduction, increased cancer risk, and disturbance in the immune and nervous system functions. Clear evidence exists that some chemicals cause these effects in wildlife.</p> <p>Objectives include:</p> <ul style="list-style-type: none"> - Establish EDCs Prioritization Working Group. - Amend 170-333 WAC. - Update multi-year CAP schedule. - Convene stakeholders & produce a draft EDC CAP by the end of 2020. - Develop recommendations & budget. - Link to priority watersheds. <p>Partners: LIOs, Industry, local governments, tribal governments, nongovernmental organizations, federal and state agencies, and public.</p> <p>Outputs: New authorities, Chemical Action Plans, Puget Sound recommendations and cost estimates, for actions, implementation steps and measures.</p>	Department of Ecology	Non site-specific	1	
2018-0467	Comprehensive, Easy-to-Use Site Productivity Map for Puget Sound Basin	<p>Riparian ecologists generally agree that most riparian ecosystem processes and functions occur within one site-potential tree height (SPTH) of the active channel. Outside of commercial forest lands, information on SPTH is available through an internet site posted by the Natural Resources Conservation Service (NRCS), however, this information is difficult to use and has substantial gaps in its spatial coverage. This NTA would correct those shortcomings. This NTA would create a new internet site that: 1) merges SPTH information from DNR and NRCS, 2) makes this information easy to use, and 3) eliminates information gaps through on-the ground surveys and statistical modelling. We will also explore using modelled and mapped plant association groups (PAGs) to estimate SPTH. PAGs were suggested to us by ecologists at the Northwest Indian Fisheries Commission (NWIFC). WDFW would form a consortium with DNR, NRCS, and NWIFC for this regional project.</p>	Department of Fish and Wildlife	Non site-specific	1	
2018-0471	Priority Habitat and Species Maps of Critical Areas for Chinook and other salmon	<p>Description: This project will (1) create a data system that outputs (a) soundwide maps of what WDFW considers to meet the GMA's definition of "Fish and Wildlife Habitat Conservation Areas" for Chinook (and other salmon) and (b) areas currently designated as Critical Areas by local jurisdictions, (2) create guidance for how to delineate riparian areas on-the-ground consistent with WDFW's 2018 PHS riparian document, and (3) provide for WDFW staff to train/engage with local jurisdictions and LIOs regarding these maps and guidance. This project will result in local governments receiving training and guidance from WDFW regarding land use actions they can take to protect Chinook and other salmon consistent with WDFW's most recent science. This project will contribute to the Priority Habitats and Species program's ability to provide technical assistance and curate/purvey BAS.</p>	Department of Fish and Wildlife	Non site-specific	1	

2018-0483	City Habitats: Green Roads, Healthy Communities - Alternative Approaches to Accelerate Stormwater Investment	<p>The project is designed to drive the collaboration, investments and science required to install green infrastructure in critical locations and at the scale needed to address Puget Sound's stormwater.</p> <p>1) Use science and data to identify the bridges and roads with the most significant impact on salmon bearing and critical waterways. Develop and deploy tools to support fast, smart decisions to reduce runoff.</p> <p>2) Pilot alternative compliance demonstration projects that use a private development company and performance-based contracts. Rely on private capital to design, build, and maintain projects, with investors being repaid over time.</p> <p>3) Projects will engage community based organizations to identify, design and build projects that eliminate toxic runoff from priority waterways and support other community benefits, includes depaves, rain gardens, green walls, and diverting bridge downspouts in areas adjacent to transportation infrastructure.</p>	The Nature Conservancy	Non site-specific	1	
2018-0485	Making the Most of What You Already Got, Part 2: Exploring Relationships between Chinook Stock Productivity and Watershed Condition	<p>One of the great unanswered questions regarding freshwater salmon habitat is how do changes in land use in a watershed effect changes in salmon stock abundance. This NTA follows from NTA 2018-0482. With geo-referenced historical data for adult spawner abundances for a watershed, we will develop statistical relationships between the Chinook abundance and watershed conditions. We will develop local relationships separately for each watershed in the Puget Sound basin where the salmon data are adequate. And, we will also explore the global relationship across all watersheds. A time-series of historical land cover data for each watershed will be created from digital orthophotos using eCognition image analysis software. Orthophotos are the only land cover "data" that are decades old.</p>	Department of Fish and Wildlife	Non site-specific	1	
2018-0488	Template for Biennial Reporting of Land Cover Change	<p>This project will create a template that will be used for reporting the amount and rate of biennial land cover change. Through a facilitated process, representatives of counties, cities, tribes, and state agencies will determine how to report jurisdiction-scale status and trends in land cover change as identified through WDFW's High Resolution Change Detection data. The report will include an analysis of change within critical areas, including riparian ecosystems as described by WDFW's recent update to its riparian management recommendations under the Priority Habitats and Species (PHS) program.</p>	Department of Fish and Wildlife	Non site-specific	1	
2018-0492	Identification of a chemical tracer for boat-related wastewater discharges to Puget Sound	<p>Boat-based discharges are an important source of bacterial contamination to Puget Sound. Boat waste, however, is only one of a number of sources; others include CSOs, poorly functioning septic systems, and surface runoff. Reliable methods to differentiate bacterial loading from these sources are critical to effective management, yet options are limited. Traditional bacteria indicators do not differentiate between source organisms (e.g., human vs. wildlife) or activities. We propose to address the issue by identifying a suite of chemical tracers specific to boat-related wastewater, and then characterizing their occurrence in the Puget Sound, focusing on sensitive areas. This tool will support the evaluation and comparison of different sources at a given site, provide valuable information for developing rational policy and management responses, and can be incorporated into an effective outreach campaign, demonstrating the link between human activities and environmental impacts.</p>	University of Washington Tacoma	Non site-specific	1	
2018-0513	Reducing plastic pollution in Puget Sound watersheds	<p>Micro- and macroplastics in Puget Sound marine water and organisms have been studied but there is a significant gap in our understanding of plastics in our freshwater systems, including sources. This project helps address that gap by testing, refining and using a new standard protocol developed by EPA for community assessment of litter. We will provide support (financial and other) to small volunteer groups and conduct unique assessments throughout the region so that a baseline dataset is developed that has credible and comparable data across the region. This information will then be used to create outreach/educational materials tailored with geo-specific watershed data in order to inspire voluntary and policy changes in local jurisdictions. Many residents and decision-makers in the region don't correlate their use of single-use disposable plastics to aquatic impacts. Ultimately, the goal is to reduce plastics in salmon, shellfish and other species in watersheds and in Puget Sound.</p>	Zero Waste Washington	Non site-specific	1	

2018-0521	Natures Value in the Salish Sea: Embracing a Regional Recreational Economy	Earth Economics will conduct an economic assessment of the Salish Sea. This will include looking at the ecosystem services provided to local communities by a healthy Salish Sea, along with comparison to ecosystem services provided by degraded ecosystems in the Salish Sea. The main output will be a final report in which is stated the economic value of the Salish Sea.	Earth Economics	Non site-specific	1	
2018-0525	Shoreline Monitoring Toolbox: Data Analysis and Interpretation	The Shoreline Monitoring Toolbox (wsg.washington.edu/toolbox) provides standardized approaches to monitor shorelines in Puget Sound. The online toolbox was launched in 2014 and includes more than 15 protocols for physical and biological monitoring, such as beach profile, sediment size, breach wrack, birds, insects, fish, and wrack invertebrates. A database is being developed through NTA 2016-0119 that will house data in a central location. Upon completion, this will provide recommendations on next steps in using the database to assess restoration effectiveness and the benefits of shoreline armor removal, and to support partners in project evaluation and adaptive management. Our methods for success will utilize these recommendations, by analyzing and interpreting data uploaded to the toolbox database. This will broaden the scale of monitoring projects, and provide sound-wide guidance for metrics of restoration success, status and trends, and adaptive management into the future.	Washington Sea Grant	Non site-specific	1	
2018-0527	The Economic Benefits of the Southern Resident Killer Whales	Whale watching is a popular tourist attraction in the Puget Sound. However, local killer whales are a threatened species. Earth Economics will conduct an economic assessment of the whale watching industry to demonstrate its value to the local economy and communities in order to justify investing in protecting this species.	Earth Economics	Non site-specific	1	
2018-0529	Prioritizing Habitat Restoration in Puget Sound: Using Ecosystem Services Values to Asses Salmon Habitat Restoration Projects	An ecosystem services valuation of salmon habitat will help demonstrate which restoration efforts to prioritize.	Earth Economics	Non site-specific	1	
2018-0536	Intersections for Action: A Future for Stormwater Management (phase 2)	The purpose of this project is to provide training and education to a wider audience on solving urban problems by collectively addressing three root causes: increases in toxic and eroding stormwater runoff, urban sprawl encroaching on healthy natural spaces, and the decline of healthy salmon populations. Strategies that guide this effort build to the convening of workshops and discussion groups that are informed, motivated and give hands-on training toward changing the traditional thinking of solving these three issues independently. Through resource development, promotion of concept (short video and intro webinars), development of online sections on key issues and the convening of gatherings for discussion, the Washington Stormwater Center at WSU will start with what it knows (resource development, online program area, hosting and convening groups) and then move into the more complex arena of engaging dialogue and hosting disparate groups across the Sound.	Washington State University	Non site-specific	1	
2018-0540	Regional Implementation of the Puget Sound Starts Here Campaign		King County	Non site-specific	1	
2018-0552	Floodplains by Design: Accelerating multi-benefit reach scale planning, design and project implementation	Multiple interests in floodplains often conflict slowing progress toward Puget Sound recovery. This NTA will link local watershed concerns and needs across interests and geographies with solutions that remove barriers, accelerate actions and lower costs. This NTA will fund the following: 1) A regional technical team that supports multi-benefit planning, design and implementation that incorporates climate science at the local level 2) Convening local, technical and policy leaders that creates enabling factors that reduces on-the-ground challenges/barriers (i.e. targeted workshops; field trips; small task teams). Actions and barriers identified in the Puget Sound Federal Task Force Action Plan will be identified as priorities 3) Pilot innovative engagement tools and refine existing tools (i.e. Skagit HDM, Photovoice; La Connor design charrette) that advances integrated reach scale planning, community decision-making, and multi-benefit project design.	The Nature Conservancy	Non site-specific	1	

2018-0558	Floodplains by Design: Inspiring a healthy rivers movement through strategic communications, information and a learning network	We will: (1) Implement a robust communications campaign that broadens support for integrated management of Puget Sound's floodplains. Tactics include workshops, events, social marketing, media, print communications, videos, and corporate engagement. We will evaluate progress toward the behavior changes needed to achieve healthy rivers and resilient communities. (2) Create a floodplain leadership development program that will prepare and challenge a cohort of local leaders to accelerate river restoration and flood/climate risk reduction. Leaders will be exposed to and learn innovative techniques to bridge the technical and social aspects inherent in large scale projects. (3) Build the economic case for integrated floodplain management to help decision makers incorporate true life cycle costs, damages avoided, and full accounting of costs/benefits. Better information and tools will improve evaluation of tradeoffs between traditional and integrated grey-green infrastructure options.	The Nature Conservancy	Non site-specific	1	
2018-0566	Natural Yard Care Behavior Change Campaign		King County	Non site-specific	1	
2018-0567	Communicating Best Practices with Underserved Audiences		King County	Non site-specific	1	
2018-0570	Floodplains by Design: Social vulnerability, human well-being and adaptation to flood risk	Intense population growth is projected for the Puget Sound region over the next decade, while flood risk is increasing due to climate change and land use decisions. As these changes occur, it is critical that vulnerable populations based on socio-economic status, language, education, or minority status, are not pushed into high flood risk areas. Additionally, small communities with limited tax base may not have access to resources needed to adapt to flood risk. This NTA will: 1. Develop strategies to engage communities and better communicate flood risk. Map current and future flood extent based on probabilistic future flows. 2. Identify vulnerable communities at risk to flooding, and assess flood risk impacts on human well-being. Ground-truth spatial analyses of vulnerability with qualitative interviews to inform effective adaptation strategies. 3. Develop climate adaptation strategies that address vulnerable communities' needs and land use decisions in high risk areas.	The Nature Conservancy	Non site-specific	1	
2018-0573	Action Plan for Salmon Predation by Pinnipeds: Managing Protected Species Interactions	Long Live the Kings (LLTK) proposes to convene scientists and managers to develop an action plan for salmon predation by pinnipeds. Recent science suggests growing pinniped populations have resulted in increased mortality of Puget Sound salmon, including ESA-listed Puget Sound Chinook and steelhead. Pinnipeds are also federally protected, requiring specific management considerations. LLTK will coordinate a science-management body to synthesize and review information about the level of impact by pinniped, salmonids/life-stages, and locations (eg hot spots) in Puget Sound. Factors possibly exacerbating predation (infrastructure, haul-outs, hatchery strategies, presence/absence of forage fish) will also be assessed. Solutions will be modeled (via Atlantis/affiliated NTA), and field tests recommended. Pinniped monitoring is a known outcome and guidance will be provided. Further, the MMPA will be reviewed relative to needed actions. Results will inform recovery planning (affiliated NTA).	Long Live the Kings	Non site-specific	1	
2018-0574	Citizen Action Training School	A handful of Puget Sound fishery enhancement groups are working towards implementing another series of the Citizen Action Training School sessions. CATS utilizes a proven approach to increase citizens' science-based knowledge and environmental literacy and facilitates behavior change that is beneficial to Puget Sound (PS) health. All CATS instruction will be solution-oriented and focused on actions. Past CATS sessions have engaged approx. 20 citizens in each area, with most showing an increased awareness of environmental issues and how to be part of the process. This free 12-week program culminates with a final service project in which participants develop a project in one of the focus areas to help Puget Sound, directly benefiting Puget Sound and addressing numerous regional approaches on the 2018 Action Agenda. The CATS program is unique in how it increases citizen capacity to become part of the solution while learning about watershed management and our natural resources.	Hood Canal Salmon Enhancement Group	Non site-specific	1	

2018-0576	Characterization of sediment-bound contaminant fluxes for large rivers that feed into the Puget Sound.	Follow the model of work we have established at the Duwamish River to train PSP LIOs. Specifically, how to collect width and depth integrated water samples to determine SSC, alongside continuous monitoring of river turbidity to create an estimate for continuous SSC. How to collect width and depth integrated water samples and analyze them for contaminants. How to collect pumped water samples and use portable centrifuges to compile suspended sediment that can be analyzed for particle size and contaminants sorbed to the sediment. Demonstrate the use of continuous river discharge to estimate total and fine particle suspended sediment and associated chemical fluxes.	US Geological Survey	Non site-specific	1	1
2018-0582	Beach Restoration and Projection Strategy Development Phase 2	Most Puget Sound shores consist of drift cell beach systems, where sediment from eroding feeder bluffs sustains down-drift shoreforms and habitats. This project will compile and refine new data into a beach strategy geodatabase. Collaborative meetings with regional nearshore experts will create new prioritization metrics to identify targets for restoration and protection of beach ecosystems. The resulting updated beach strategies will offer improved accuracy and resolution to more effectively restore and protect Puget Sound beach systems. The resulting updated beach strategies will offer improved accuracy and resolution to more effectively restore and protect Puget Sound beach systems.	Department of Fish and Wildlife	Non site-specific	1	
2018-0585	Long-term MS4 Planning to Protect and Restore Water Quality: Strategies, guidance and innovative approaches for lowland streams and Puget Sound recovery	This NTA supports development of long-term Municipal Separate Storm Sewer System (MS4) planning with the goal of protection and restoration of the beneficial uses of receiving waters. To help meet this purpose, the Stormwater Management Manual for Western Washington (SWMMWW) update in 2019 will include guidance to support a prioritization and planning process on a watershed scale that results in targeted investments in BMPs and capital actions that contribute to preventing and reducing impacts to receiving waters. These investments will reduce discharge of polychlorinated biphenyls (PCBs) and other toxics to Puget Sound, benefiting orcas and other marine life depended on a healthy ecosystem. Chinook and other orca prey salmonids also rely on the natural hydrologic processes that these programs protect and restore. This planning is intended to put stormwater in a broader context with other actions needed to protect and restore beneficial uses.	Department of Ecology	Non site-specific	1	
2018-0592	Beach Protection and Restoration Strategies Phase 3	This project will facilitate restoration and protection actions for Puget Sound Shorelines through the development and maintenance of an online, interactive tool that depicts key shoreline information and recommendations for restoration or protection actions at user-defined spatial scales.	Department of Fish and Wildlife	Non site-specific	1	
2018-0593	Chinook habitat restoration decision support tool- Predicting restoration driven chinook growth improvements using an integrated temperature, flow, and bioenergetics model.	Currently, few tools are available for managers to predict the improved fish growth that comes from restoration actions, such as riparian acquisitions, riparian planting or levee setbacks. Managers need tools that can predict salmonid growth potential given different decision scenarios. Chinook recovery can be evaluated via a stream temperature, flow, and fish bioenergetics model that is calibrated to and then predicts, chinook growth under different remediation strategies. Considered strategies could include changes to riparian habitat, instream flows, and terrestrial food supply. Such a modeling tool would allow both screening-level predictions based on currently available data and specific outputs based on site-specific data requiring a few, easily collected site-specific values. Such a tool would allow managers the ability to predict and compare chinook growth under current and future conditions for different remediation actions.	US Geological Survey	Non site-specific	1	

2018-0600	Incorporation of Salish Sea Marine Survival Project findings and recommendations into local Recovery Plans	Support lead entities with incorporation of Salish Sea Marine Survival Project results into their local Salmon Recovery Plans and supporting documents. Many Lead Entities updating their Recovery Plans in 2018-2019. Integrating new science and recommendations from the marine survival project will bring in new strategies and actions to expedite recovery. Adopting new strategies and developing new project types requires understanding and buy-in from the local restoration community. LLTK will host a regional workshop to relay the findings to local technical committee members; watersheds may then choose to incorporate the information on their own or request assistance from LLTK to coach their local committees through an adaptive management process. This NTA is complementary to others: development of Chinook chapter updates or steelhead chapters, zooplankton monitoring (#2018-0575), development of an action plan for pinniped predators (#2018-0573) and the WDFW nearshore geospatial tool.	Long Live the Kings	Non site-specific	1	
2018-0602	Puget Sound Atlantis Ecosystem Modeling	Long Live the Kings and NOAA's NW Fisheries Science Center propose to collaborate on the implementation of the Puget Sound Atlantis ecosystem/socio-economic model to evaluate problems and ID best solutions for Puget Sound salmon and ecosystem recovery. One primary goal is to integrate Atlantis with EPA's terrestrial ecohydrological model (VELMA) and the ocean circulation & biogeochemistry model (Salish Sea Model). This will result in a whole-basin system that dynamically simulates biophysical interactions and element transfer across terrestrial-marine boundaries. The linked models will better capture the propagation of impacts throughout the terrestrial-marine ecosystem and allow managers to play out ecological, social and economic consequences of alternative ecosystem restoration choices. Specific objectives are to assess impacts of climate, nutrients, turbidity and contaminants with the multi-model approach and test specific solutions that maximize value in reducing negative impacts.	Long Live the Kings	Non site-specific	1	
2018-0603	PSNERP Outreach, Engagement, and Project Prioritization	One of the products of the Puget Sound Nearshore Ecosystem Restoration Project (PSNERP) General Investigation study (completed in Dec. 2016) is a list of 36 project sites throughout Puget Sound that propose actions to address degradation of important nearshore processes. Sixteen of these PSNERP-identified projects are located in Puget Sound's major river estuaries and several more are located in smaller estuaries and coastal inlets. This NTA will focus efforts on engaging communities and other partners to understand restoration opportunities available through the Army Corps of Engineers' ecosystem restoration mission and collecting data to inform robust conversations for informed decision making.	Department of Fish and Wildlife	Non site-specific	1	
2018-0606	Building Cities in the Rain: Criteria Weighting Methodology	This project will establish and apply a methodology for ranking watersheds within a jurisdiction using the data sources identified in the BCitR guidance. The project will "weight" available local data sources, allowing a jurisdiction to identify specific watersheds that should be prioritized for stormwater investments to best support environmental restoration and protection of critical aquatic habitats. The methodology developed through this effort will be tested at the local level, through application to Kirkland's watersheds. Success will be measured by the development of a prioritized list of watersheds, ranked for stormwater investments.	City of Kirkland	Non site-specific	1	
2018-0607	Protection of Chinook Habitat from Invasive European Green Crabs	Eelgrass beds, critical habitat for juvenile Chinook and the forage fish they depend on at multiple life stages, are at high risk of harm from the first-ever detections of European green crab (<i>Carcinus maenas</i>) in Puget Sound in 2016/17. European green crab is classified as a prohibited level 1 species (highest risk) by WDFW and early detection and rapid response to new detections are identified as the best management methods to protect intact eelgrass ecosystems and address the risks of predation and habitat loss from this species (as seen in sea grass losses in the NE US and recently detected on Vancouver Is. in British Columbia). The proposal is to train, equip, and provide coordination to a network of up to 20 tribal and stakeholder groups to form a regional network of prospecting and quick-strike teams capable of conducting extensive monitoring in critical habitat or for new detections to determine populations, scope of infestation, and suppression as needed.	Department of Fish and Wildlife	Non site-specific	1	

2018-0612	Agency Coordination on Bridges and Estuary Restoration	Many small and large estuaries along Puget Sound's shoreline are impacted by roadway infrastructure (bridges, fill, causeways, armor, etc.). Restoring habitat in these locations can be achieved by vacating and removing the infrastructure that is causing the habitat degradation. But in many locations, the roadway is major infrastructure necessary for commerce and/or it is an emergency access route. In these instances, modifying or relocating the roadway infrastructure are the only viable options to achieve the intended habitat restoration goals. This NTA would work with partners to evaluate current state and federal policies and funding practices to identify efficiencies and develop agreements on how to prioritize and fund these types of activities.	Department of Fish and Wildlife	Non site-specific	1	
2018-0625	Characterization of sediment bound pollutants as a function of particle size and effect on stormwater best management practice effectiveness	We will collect stormwater runoff and road solids from a range of land uses (industrial, commercial, low and high residential) to characterize the amount of sediment bound pollution (PCBs, PAHs, PBDEs, metals) as a function of particle size. This sediment characterization data will be used with new and existing data on sediment particle size distribution from paired inlet-outlet flow data at stormwater BMPs to identify the effectiveness of these BMPs at removing sediment-bound toxics. This information will be used to examine a range of stormwater BMPs (retention ponds, rain gardens, wetlands, retrofits) to determine what technologies work best at removing sediment-bound toxics. We will partner with ongoing effectiveness studies funded through the Stormwater Action Monitoring program to obtain the needed BMP flow data. Flow and particle size data at additional BMPs will be collected as needed.	US Geological Survey	Non site-specific	1	
2018-0628	Social Marketing for Salish Sea tribal communities	<ul style="list-style-type: none"> ◆ This project will conduct surveys and focus groups within Salish Sea tribal communities to gather information about attitudes, trusted messengers, and resonating messages related to stormwater pollution within participating tribal communities. ◆ The survey results will be included into a database available to all participating tribes for use into the future. ◆ This information will support the necessity of stormwater management and outreach with tribal leadership as well can be used implementing education, outreach and public involvement in pollution prevention. 	The Tulalip Tribes	Non site-specific	1	
2018-0632	Development of Shared Georeferenced Database with Associated Library and Visualization Tools Focused on Salmon Recovery in Puget Sound	<p>Information to support Salmon Recovery in Puget Sound is spread across numerous websites and within individual Agencies, Municipalities, and Organizations. This project would coordinate with the PSEMP to combine the dispersed information into an easily-accessed, shared, and open web data portal consisting of:</p> <ul style="list-style-type: none"> --A georeferenced database containing data needed to track the health of Puget Sound and the recovery of salmon and habitat. --A georeferenced map library including bathymetry, topographic, habitat, toxics, and other related maps. --A photograph library (aerials, stills, and videos) with available meta data including location and date. --A document library of scientific, technical, regulatory, and policy solutions to salmon and habitat recovery. --A topic-driven forum to facilitate discussion, sharing, and evolving tools, policy, and science. <p>Initial implementation will be focused on data from Puget Sound studies plus 1 to 3 existing WRIAs.</p>	PureBlue	Non site-specific	1	

2018-0633	Decision analysis for prioritizing habitat conservation actions for salmon	We propose to develop a decision-analytic framework for salmon habitat management in Puget Sound. This process will involve, 1) development of a framework encompassing the management objectives, an approach to describing the alternative management actions (e.g., sets of habitat restoration actions) under consideration at any given time, and models designed to predict how alternatives would perform in terms of the management objectives; 2) identification of key uncertainties that impact model predictions and thereby management decisions; and 3) development and testing of a framework for making decisions about alternative management actions for salmon habitat conservation in the Puget Sound, that accounts for while seeking to reduce uncertainty over time. The decision-analytic framework developed in this project will align management decisions to salmon biology, as well as ecological, institutional, and social needs and limitations.	University of Washington	Non site-specific	1	
2018-0640	Floodplains by Design: Aligning the state's floodplain programs with ecosystem recovery priorities	We will work with the Department of Ecology to modernize the state's guidance for developing Comprehensive Flood Hazard Management Plans. CFHMPs are the primary vehicle by which communities plan for flooding and floodplain uses, but the existing (1991) guidance does not incorporate multiple benefits (e.g. salmon habitat) or climate change. Further CFHMPs are separate from FEMA/EMD hazard mitigation plans and other floodplain plans and associated funding programs. This NTA will modernize and integrate outdated programs, enabling communities to unify efforts and better leverage resources. The guidance update process would engage representatives from 4 or more Puget Sound watersheds to provide input on their planning needs. The new guidance would include recommendations on: integrated planning processes; incorporating habitat, climate and other technical information; aligning CFHMPs with FbD, EMD and FEMA funding/planning programs. Updates to other programs may also be appropriate.	The Nature Conservancy	Non site-specific	1	
2018-0645	Task Force for Natural Resource Damage Assessment and Restoration (NRDAR) pre-coordination and planning	Puget Sound is at high risk for oil spills due to increased oil transportation in the U.S. and in Canada. Preparation is paramount in the event of an oil spill: not only for cleanup, but for assessing damages done by the spill and administering restoration. NRDAR requires early evaluation and collection of ephemeral data, which is critical for subsequent damage assessment and adequate recovery of injured natural and cultural resources. Being prepared to implement scientifically valid studies to quantify injury immediately following a spill requires much coordination among trustee agencies, and often lacks attention during a response when cleanup is prioritized. A NRDAR task force would initiate pre-spill coordination among potential trustees in the following areas: establishing prearranged agreements for efficient collaboration, US-Canada cooperation for trans-boundary spills, developing NRDAR tools and sampling protocols for ephemeral data, and establishing means for sample analysis.	US Fish and Wildlife Service	Non site-specific	1	
2018-0646	Residential Green Stormwater Infrastructure Maintenance: Effective Education and Outreach Model	This project will model, test and evaluate outreach methods for communicating GSI facility maintenance information to single-family property owners. It will involve research and review of strategies and tools that have been previously created to promote residential GSI maintenance, as well as target audience research. Based on research, a suite of outreach strategies and maintenance materials will be developed, tested and evaluated for their effectiveness across a range of Puget Sound communities. This project will create customizable, regionally applicable residential GSI maintenance resources, as well as replicable delivery strategies. Final deliverables will be dictated by testing process, but may include maintenance guides, checklists, troubleshooting FAQ's, e-calendar reminders, web tutorials, etc. A GSI maintenance outreach implementation guide will also be created.	City of Kirkland	Non site-specific	1	

2018-0649	Community Based K-12 Shellfish Education, Environmental Science and Stewardship: Meeting Washington Shellfish Initiative Goal 7: Educate the next generation about shellfish resources, ecosystem services and water quality.	Provide K-12 shellfish education targeting schools in priority shellfish recovery areas. NTA will support development and delivery of shellfish based curricula, such as Garden of the Salish Sea Curriculum (Pacific Shellfish Institute), convene and train educators to broaden the reach of schools based shellfish education and stewardship programs. Use shellfish as a vehicle to teach pollution prevention centered upon hands-on learning through field experience focused on the inter-tidal ecosystem. By interacting with shellfish and inter-tidal organisms in their habitat, students are inspired to practice watershed healthy habits, engage the participation of their families and communities and become motivated to pursue conservation and science. Use a Salish Sea Challenge tool to motivate practice of watershed healthy habits and record actions to demonstrate positive the impact of education for shellfish recovery and maintaining Approved status	Pacific Shellfish Institute	Non site-specific	1	
2018-0652	Ecological Integrity Assessments as an approach to prioritize protection and restoration actions and monitor progress in the Puget Sound Basin	Ecological Integrity Assessments (EIAs) were developed by the Washington Natural Heritage Program (NHP) and others to measure the condition of ecosystems using standardized metrics to categorize sites into condition classes. We propose to complete a Level 1 EIA (GIS based) in the Puget Sound basin to assess current conditions of natural areas and identify the locations of ecologically important lands. Level 2 (rapid ground-based) EIAs would be conducted at sites identified through the Level 1 EIA to identify and prioritize areas with high conservation value for protection and sites for restoration. This classification system can also be used to set restoration targets and measure progress toward achieving goals. NHP would deliver online and in-person training to improve the capacity of land managers to assess current conditions and monitor restoration progress using EIAs. Several land trusts have already expressed interest in using EIAs. EIA data would be made available on-line.	Department of Natural Resources	Non site-specific	1	
2018-0655	Salish Sea Modeling Support to complete MWQ/Nutrient IS	The use of the Salish Sea Model (SSM) is essential to develop the MWQ IS. Excess nutrient loads degrade water quality with clear potential to impact salmonid survival in marine waters. Ecology has assumed responsibility to develop the MWQ IS, however, no money is currently allocated for continued application of the SSM beyond the current funding end date of June 30, 2019. Use of the SSM in conjunction with the workings of the IDT is essential beginning July 1, 2019 June 30, 2021, and includes modeling costs to validate impacts and approaches suggested by the IDT. While model input files and post processing is completed by Ecology, the model is run in PNNL's Unix computer cluster. Funding is needed to pay for: using the Unix cluster, troubleshooting and fixing problems that arise, updating post-processing tools, technical support, and task management. It is important to recognize this will fund the completion of the evaluation modeling that supports completing the MWQ IS.	Department of Ecology	Non site-specific	1	
2018-0658	Regional Pet Waste Social Marketing Campaign	Dog waste pollutes stormwater with nutrients, pathogens, and fecal coliforms. Local jurisdictions have begun conducting audience research and developing tools to increase dog waste pick up, however, these efforts have not been aligned. To create broadscale change, a regional campaign that synthesizes early work and creates tools, ads, and materials is required. To accomplish this, we will: -Synthesize existing local audience research and tools -Conduct regional audience research to determine the existing behaviors, benefits, and barriers of proper pet waste disposal -Test, refine tools and develop new outreach tools to motivate proper pet waste management -Develop partnerships with relevant community partners (e.g., veterinary clinics, pet adoption agencies, rescue organizations and pet stores) to help conduct regional outreach campaign. -Pilot a regional pet waste management campaign -Conduct program evaluation -Develop and disseminate regional pet waste management toolkit	King County	Non site-specific	1	

2018-0660	Puget Sound Watershed Characterization mid-scale modeling Phase II	Ecology is developing a new set of models to evaluate hydrologic condition in watersheds where growth is planned. The project is building off of methods developed by King County scientists to evaluate Critical Areas Ordinance effectiveness. The models will assess hydrologic condition using indicators such as stream flashiness or low-flows based upon a combinations of factors such as land cover, geology, and distance to stream and will consider climate change projections. Tools will be developed to facilitate alternative futures scenario building by local planners whereby they can locate spatially where new development in a watershed could alter land cover in the future and assess the likely impact to hydrologic processes. This information can be used to assess the ramifications of zoning and the likely build-out which would result. The models are intended to provide planning-level tools at a lower level of effort an expense than existing high accuracy hydrologic models.	Department of Ecology	Non site-specific	1	
2018-0669	Watershed Characterization Technical Assistance Team	This NTA will continue the interagency collaboration between the Washington State Departments of Ecology, Fish and Wildlife, and Commerce called the Watershed Characterization Technical Assistance Team (WCTAT). WCTAT staff support local governments in planning activities such as those which are required under the Growth Management Act, including Comprehensive Planning and Critical Areas Ordinance updates. Using a set of indices developed by the Puget Sound Watershed Characterization project, the WCTAT brings consideration of important watershed processes and habitats as local governments plan for growth and land use. The WCTAT has also applied the indices to many other applications including watershed strategies developed by tribes, salmon recovery lead entities, and non-governmental organizations focused on Puget Sound basin protection and recovery. This NTA will ensure that the collaboration continues across the three agencies during the 2018-2022 time period.	Department of Ecology	Non site-specific	1	
2018-0675	A framework and guidance for sub-tidal habitat monitoring in Puget Sound	The activities proposed as part of this action include: 1) Facilitate collaboration among entities conducting sub-tidal SCUBA-based monitoring of habitat characteristics at sites in Puget Sound, either via a stand-alone workshop, a special session at the Salish Sea Ecosystem Conference, or via remote, on-line network facilitation tools. This collaboration would be used to develop a comprehensive map of existing sub-tidal monitoring sites, to cross-walk methods and data types collected at those sites, and to assess how sub-tidal monitoring can be optimized to support Puget Sound restoration 2) Develop a set of habitat specific shared protocols that would enable the comparison of observations and habitat attributes across sites in Puget Sound, and analysis approaches. 3) Extend existing monitoring time-series at sub-tidal monitoring sites utilizing the shared protocols.	US Geological Survey	Non site-specific	1	
2018-0685	Prioritizing Sea Level Rise Exposure and Habitat Sensitivity Across Puget Sound	The Washington Coastal Resilience Project team is developing localized sea level rise (SLR) projections in a probabilistic framework for Washington State. This action will translate those SLR projections into products that can be used to assess future hazard exposure, at the parcel scale, associated with either intermittent flooding, inundation or erosion/shoreline change. Exposure assessment may include partnership with the USGS proposed CoSMOS modelling framework. If capacity/funding allow the exposure assessment will be followed by a quantitative analysis of parcel-scale sensitivity to flooding/erosion, that could include a variety of infrastructure and habitat attributes. The proposed products would provide a means for: 1) incorporating considerations related to climate-driven SLR into restoration site selection and design and 2) identifying areas across Puget Sound or within specific LIOs that optimize long-term restoration benefits while reducing SLR vulnerabilities.	Washington Sea Grant	Non site-specific	1	

2018-0692	Map Viewer of ecologically important areas in the Puget Sound basin	<p>In 2017, the Washington Natural Heritage Program (NHP) released the Wetlands of High Conservation Value Map Viewer. This publicly available map viewer shows the known locations of wetland and riparian plant communities, and rare plant and nonvascular species tracked by the NHP. This map viewer was developed to increase accessibility to information relevant for the Department of Ecology wetland rating system.</p> <p>We propose to enhance the map viewer for the Puget Sound basin by adding the locations of rare and high quality upland ecosystems. This project will also add new information to the map viewer, including the Ecological Integrity Assessment (a method to assess the current status, including composition and function) of each ecosystem, thus increasing knowledge of the current condition of rare and high quality ecosystems.</p> <p>This information will improve knowledge of ecologically important lands and the ability to identify knowledge gaps.</p>	Department of Natural Resources	Non site-specific	1	
2018-0726	Puget Sound Regional Riparian Cover Mapping Standards and Implementation	<p>ESA has been working in the Skagit Watershed to develop an approach for mapping riparian cover and assessing riparian conditions using a combination of remotely-sensed derived data in combination with high resolution local data and regional data layers. This proposed NTA, supported by WDFW's High Resolution Land Cover Mapping (Ken Pierce) and WDNR's Photogrammetry team, would build off of work completed in the Skagit Watershed in order to develop a standardized approach and to extend riparian cover mapping to other watersheds in the Puget Sound. With support from the Puget Sound Partnership, ESA and project partners would work closely with Lead entities and local riparian experts for standardizing riparian mapping efforts for the region that supports PSP Vital Signs and Common Indicators, Ecology, and Tribal needs.</p>	Environmental Science Associates (ESA)	Non site-specific	1	
2018-0730	Floodplain Recovery Target Refinement: Application to Watersheds	<p>Under a currently-funded NTA (2016-0401), ESA is working with Ecology and PSP to establish the foundation to assess, monitor, and report information regarding PSP's Floodplain Implementation Strategy and Vital Sign indicator target. As part of the current effort, ESA will conduct pilot assessments of three Puget Sound watersheds. This proposal would extend the findings of the current project to other major Puget Sound watersheds. We would work with PSP and Ecology to develop a scalable process to select either three additional watersheds through a collaborative selection process or complete all of the remaining 14 major Puget Sound watersheds (depending on funding). We would work closely with PSP to conduct meetings with stakeholders in selected watersheds and apply the decision-rules using regional and locally-accepted data. This would lead to more consistent baseline floodplain extent and condition mapping region-wide and would improve tracking of the Floodplains Vital Sign.</p>	Environmental Science Associates (ESA)	Non site-specific	1	
2018-0733	Evaluate the importance of eelgrass as nursery habitat for juvenile salmon	<p>Through sampling by appropriate means across a range of eelgrass and other nearshore and offshore habitats, determine what types of eelgrass (on river deltas versus fringing beaches; with respect to eelgrass metrics including shoot density and canopy height) are most used by juvenile salmon, and under what circumstances (timing during outmigration; water column properties including temperature). Compare juvenile salmon use between eelgrass and other habitats to assess the relative importance of eelgrass. Compare juvenile salmon size and growth, prey availability, and habitat-specific contributions to growth (diets, stable isotopes) across different types of eelgrass and other habitats to establish the role of eelgrass as trophic support. Team with eelgrass restoration efforts to assess development of eelgrass functionality in support of salmon. Integrate with other sampling efforts to determine relative importance across the range of habitats used by outmigrating salmon.</p>	US Geological Survey	Non site-specific	1	

2018-0735	Puget Sound Mapping Program	Mapping tools can help local governments plan and manage growth under the GMA but they don't always have the resources to develop and utilize these resources. State agencies and regional councils often need similar mapped information standardized across jurisdictions for regional or resource based analysis. To assist, Commerce would update existing Puget Sound Mapping Project zoning and development maps to analyze planned vs. actual development, through 2022. We would also expand the mapping to include, among others things; i) long-term low-density lands (such as golf courses, cemeteries, parks), and ii) amount of urban housing occurring on septic systems. Lastly, we would develop a web-interface tool that integrates maps that would assist local governments under the GMA, and aid Puget Sound Recovery planning and analysis. We would collaborate and prioritize this work with stakeholders, and through our work on the Watershed Technical Assistance Team and interagency mapping teams.	Department of Commerce	Non site-specific	1	
2018-0736	Stormwater park retrofits for water quality, compact development and human health	This project will interview planners with jurisdictions that have built multi-benefit stormwater parks to learn how these programs might be replicated. The information will be documented and will help guide a GIS analysis to identify stormwater retrofit locations with potential to improve water quality, habitat, and park access. To identify potential park locations, GIS data on site suitability (soils, ownership, land costs); level of need (impervious surfaces, existing stormwater infrastructure, water quality, salmon distribution); level of park access; and urban center designation will be used. Using a scoring matrix, suitable areas will be prioritized that have a high need for stormwater improvements and lack park access for residents. Jurisdictions that contain these areas will be interviewed to further refine the list of potential sites. Consultants will be hired to develop conceptual plans for up to 4 stormwater parks.	Puget Sound Regional Council	Non site-specific	1	
2018-0738	Developing a Pacific Northwest Regional Trash Monitoring Coalition	This action provides a framework of support to Salish Sea communities that monitor micro or macro debris. Understanding the distribution and persistence of plastic pollution throughout the Salish Sea is increasingly important as macro-plastics production continues to experience exponential growth and the breakdown of escaped plastics into microplastic particles continues to occur. With the help of external partners, EPA will standardize aquatic trash assessment and coalesce an interconnected monitoring network on a region-wide, trans-boundary scale. The network will include groups monitoring both macro and micro debris in freshwater and marine environments. This cross-cutting action aligns with the Partnership's Chinook, Shellfish, Estuaries, Sound Stewardship and Sense of Place priorities as well as every priority under the Healthy Water Quality Vital Sign. NOTE: EPA will not request funding for this action.	US EPA	Non site-specific	1	
2018-0745	Soft Shore Protection: A Review of Project Performance and Cost	Quantitative monitoring and analysis of soft shore protection project performance in meeting goals for erosion control is mostly limited to data in the Marine Shoreline Design Guidelines (MSDG; Johannessen et al. 2014). The MSDG survey data was up to 2012 at only 13 sites. New work will address a key strategy in the Armor Implementation Strategy: "Compile existing information to develop guidance to complement and help implement the MSDG". Data from protocols such as the Shoreline Monitoring Toolbox will be evaluated and used if appropriate, but is mostly inadequate within core project areas. Other existing survey quality data at a level needed for engineering and geomorphic evaluation will be compiled, incorporated, and repeated. Analysis will include evaluation of project components and storm event impacts (to include life cycle cost analysis). Recommendations will include design and specification options, implementation approaches, and long-term performance, maintenance and costs.	Coastal Geologic Services, Inc.	Non site-specific	1	

2018-0758	Interagency Coordinating Committee: Planning, planting and managing trees as green stormwater infrastructure and for the co-benefits they provide.	<p>Rapid development in the Puget Sound has resulted in reduced tree canopy, increased impervious surfaces and stormwater run-off that carries pollutants into streams, directly impacting aquatic habitat.</p> <p>Better stormwater management systems include using low-impact green stormwater infrastructure (GSI) to mitigate runoff. Tree planting as GSI is part of the solution. In addition to mitigating runoff by intercepting rainfall and through transpiration, trees provide a plethora of environmental, social, and economic. Because of the benefits they provide, tree planting is supported by many state agencies in the Puget Sound. But without careful planning, the intended long-term benefits of trees may not be realized.</p> <p>DNR will convene and facilitate an interagency team of state agencies that support planting trees for stormwater mitigation and for their co-benefits; human health; economic development; transportation corridor enhancement; food security; public landscaping; etc.</p>	Department of Natural Resources	Non site-specific	1	
2018-0764	Developing New Funding Sources and Mechanisms for the Development and Implementation of Innovative Water Treatment Solutions	<p>PureBlue is developing a finance program that will provide a combination of grants, zero and low-interest rate loans, convertible notes, and equity investments to highest-impact water treatment, management, and reuse technology companies and projects. This finance program will emphasize funding sources and models not already (or not typically) allocated to Puget Sound recovery efforts. As a result, additional sources and avenues of funding will be available for high-impact water quality and treatment approaches. For the past two years, PureBlue has been (and will continue) developing relationships with foundations, angel investors, angel groups, venture funds, private equity investors, federal agencies (e.g., NSF, EPA, EDA, DOD, DOE, DHS, NOAA), and other potential funders. These relationships will be continued and expanded to promote the objectives of developing new models and sources of funding.</p>	PureBlue	Non site-specific	1	
2018-0765	Accelerating shoreline protection and recovery - incentives and accountability (Nature's Scorecard)	<p>Nature's Scorecard (natureesscorecard.com) is an accountability tool that evaluates how well local governments are adopting best practices required under state or federal programs such as the state Shoreline Management Act and federal Clean Water Act. Most recently applied to municipal stormwater program elements required by permits, objective criteria evaluate how well local governments perform, then the scorecard interprets and shares hard-to-find information. Outreach uses a social marketing approach to showcase regional leaders, with the goal of incentivizing other governments to improve. After a refresh with updated information, the plan is to reach out to individual local governments to understand their barriers to adoption and assist as needed such as advocating for funding with elected officials. This NTA would apply the Nature's Scorecard approach to Shoreline Master Programs, then pursue regional approaches to further reduce barriers to adopting better shoreline practices.</p>	Washington Environmental Council	Non site-specific	1	
2018-0768	City Habitats: A Regional Partnership for Stormwater Innovation	<p>This NTA will expand upon the established City Habitats public/private partnership to:</p> <ol style="list-style-type: none"> 1. Accelerate implementation of stormwater solutions by developing a network of practitioners unified under a strong vision. This enable the practitioners across multiple sectors to identify and address the most significant barriers to installation of green stormwater infrastructure. 2. Significantly increase investment in stormwater management from traditional and nontraditional sources. Materials for decision makers and improved public funding sources will catalyze increased investment in stormwater. 3. Strengthen public demand for sustainable stormwater management and encourage behavior change by demonstrating utility and aesthetic appeal in diverse neighborhoods around the region. Tools, materials, and other resources will be developed to educate private landowners about the benefits of sustainable stormwater management and increase the demand for funding to implement projects. 	The Nature Conservancy	Non site-specific	1	

2018-0771	June is Orca Month - Grow public support for orca recovery, including abundant salmon, reduced toxics, and decreased vessel interference	<p>For more than a decade, Washington's Governor has declared June as Orca Month to celebrate the iconic Pacific Northwest animal and recognize the species' endangered status. In 2017, more orca deaths prompted Governor Jay Inslee to explore mechanisms to accelerate orca recovery. Public support and political will are needed, and the existing Orca-Salmon Alliance (OSA) will host Orca Month activities that trigger action by new audiences:</p> <p>(1) Strengthen connections between people and orcas (2) Publicize threats facing the Southern Resident population (3) Connect orca and Chinook salmon recovery</p> <p>Events engage new audiences and increase engagement on critical Puget Sound issues (salmon, toxics, vessels). OSA partners include Orca Network, Center for Whale Research, Defenders of Wildlife, Earthjustice, Endangered Species Coalition, Natural Resources Defense Council, Oceana, Save Our Wild Salmon, Southern Resident Killer Whale Chinook Salmon Initiative, Whale and Dolphin Conservation.</p>	Washington Environmental Council	Non site-specific	1	
2018-0772	A multi-criteria adaptive framework for assessing ecologically important lands	<p>This NTA proposes the development of a multi-tiered ecologically important lands tracking framework that would provide an improved assessment of statutorily protected lands and a system for identifying and discussing lands of intrinsic ecological value. The system would integrate three types of land assessment, simple protection based on ownership, regulatory protection for described locations (shorelands, wetlands, critical area ordinances, etc.) and the results of regional ecological models which address importance from myriad different perspectives. Such analyses include Gap analyses, Watershed Characterization, the WA Connectivity workgroup analysis, among others.</p>	Department of Fish and Wildlife	Non site-specific	1	
2018-0789	Puget Sound Funding Portfolio - past, present, and future	<p>Puget Sound protection and recovery currently involves direct and indirect funding from tribal, federal, state, regional, and local government; philanthropy and nonprofit sectors; business and institutional sectors; and individual and other private investments. However, a significant funding gap remains for the three strategic initiatives identified for Puget Sound recovery. Several organizations and coalitions have discussed mechanisms for filling at least portions of the funding gap.</p> <p>This NTA would provide a meta analysis beginning with a strategically small yet diverse group of organizations representing major current funding pools to refine the scope. Phase 1 would look retrospectively at pre-recession funding including the 2010 economic valuation report for Puget Sound. Phase 2 would build from a 2012 compilation of current funding sources. Phase 3 would develop a portfolio of potential funding sources, drawing from recent experience in San Francisco Bay and elsewhere.</p>	Washington Environmental Council	Non site-specific	1	
2018-0790	Improving Climate Change Resilience for Chinook Salmon During Summer Low Flows	<p>Seven of the eighteen major watersheds in the Puget Sound are expected to have summer low flows that are significantly impacted by climate change, but fine-scale information identifying specific streams that are likely to be most affected is lacking in most basins. Such information would assist watershed groups and agencies in prioritizing restoration and flow augmentation projects to increase salmonid resilience to changing climate conditions. We propose using hydrologic climate change scenarios data (CIG) and a previous analysis of projected streamflow changes (WDFW) to create a forecasting tool for the Puget Sound that estimates the impacts of changing climate conditions on summer low flow and water temperature at the sub-basin scale. Map-based estimates of relative potential impact will combine with reach specific species periodicity data to elucidate where the impacts are likely to create or intensify bottlenecks for migration, spawning, and rearing to guide adaptive management.</p>	Department of Fish and Wildlife	Non site-specific	1	

2018-0791	Beyond "I heart Puget Sound" - engaging the public in Puget Sound recovery	<p>A healthy Puget Sound remains popular with the public, surrounding communities, and with economic sectors that depend on Puget Sound and the Salish Sea. While science is never done, we do know as a region what best practices we should pursue and which poor practices we should change. However, even with that general support and knowledge, our region is not sufficiently supporting Puget Sound recovery and threats are increasing.</p> <p>This NTA will scope and implement an engagement campaign that includes all communities, including tribes and communities of color. The program will build on existing information and programs, such as STORM and Puget Sound Starts Here, previous messaging, and our evolving understanding of the future of Puget Sound recovery. Potential tools include multi-media platforms, including web-based communications, social media, videos, photos, articles, and books. Success will be measured as reach and actions taken.</p>	Washington Environmental Council	Non site-specific	1	
2018-0801	Regional Transfer of Development Rights Program Implementation	<p>LCLIP is an award-winning program that achieves conservation of resource lands by giving cities a financial incentive to use TDR. LCLIP creates multiple benefits by permanently protecting farms and forests through market-based transactions and by giving cities new tools to support growth through infill development, further reducing rural development pressure. So far Seattle has used the program to protect over 60,000 acres of farm and forest land and is projected to earn over \$27M for infrastructure improvements. If all 35 eligible cities in the region use the tool, it could protect 640,000 acres. One hurdle to broader use is a funding shortfall to prepare cities for adopting the program. Providing technical and administrative support would allow more cities to participate, thereby magnifying the conservation outcomes across the region and reducing rural development. Several cities have started the work to use LCLIP but lack the funding and technical expertise to implement it.</p>	Forterra	Non site-specific	1	
2018-0804	Tribal Oil Spill Caucus	<p>A Tribal Caucus is timely and needed given the recent efforts of First Nations (i.e. Heiltsuk Nation) and WA Tribes to build their capacity to plan for, prevent, and respond to oil spills in the Salish Sea. The Caucus will provide a regional forum for: sharing issue-related experience and knowledge among Tribes & First Nations; organizing participation in advisory & regulatory bodies; and establishing shared priorities for actions to improve vessel traffic and spill response systems. Initial efforts of the Caucus will be to increase tribal participation in the Regional Response Team 10 (which sets regional/state/federal oil spill response policy). Initial outputs would include a model tribal Natural Resources Damages Assessment Ordinance; a tribal oil spill response and engagement booklet (written by and for a tribal or First Nation audience) to assist in tribal capacity building efforts. The Makah Tribe's participation will ensure strong links between the Task Force and the Caucus.</p>	Makah Tribe	Non site-specific	1	
2018-0809	Growth and life history strategies of Salish Sea Chinook salmon populations as it relates to marine survival, habitat condition, and population recovery.	<p>Using otolith microchemistry we propose to evaluate the contribution of fry, parr and yearling life histories to adult Chinook returns while enumerating the success of these strategies in relationship to habitat availability/condition and early marine survival. We will evaluate the life history contribution of natural origin Chinook populations from south, mid and northern Puget Sound as well as Hood Canal and the Strait of Juan de Fuca. This work will inform restoration efforts (as it relates to life history expression and run size) while also highlighting populations that may benefit from increasing life history diversity (through habitat restoration). We will use scale morphometric analysis to estimate early ocean growth as a predictor of marine survival. We will use this growth/survival relationship to update sibling forecasting tools and test the hypothesis that growth metrics can improve forecast methodology by linking early ocean condition with survival and growth.</p>	Department of Fish and Wildlife	Non site-specific	1	

2018-0812	Nonpoint Water Quality Specialists to Protect, Re-open, and Upgrade Shellfish Growing Areas	<p>This NTA focuses six Ecology nonpoint water quality specialists on protecting, re-opening, and upgrading shellfish growing areas, supporting the Vital Sign Indicator Target of 10,800 new acres of harvestable shellfish acres by 2020.</p> <p>The specialists will protect shellfish resources by implementation of TMDL/watershed cleanup plans, promoting voluntary and incentive-based programs, and increasing compliance with environmental laws, regulations and permits. Emphasis on the following Vital Sign Regional Priorities:</p> <ul style="list-style-type: none"> -Upgrade the Samish and Portage Bay shellfish growing areas -Re-open or upgrade shellfish growing areas -Protect water quality in "threatened" or "concerned" shellfish growing areas -Maintain the status of open shellfish beds -Prevent fecal pollution from humans (septic systems) and animals (livestock) <p>Partners in this effort include Department of Health, Conservation Districts, Shellfish Protection Districts, tribes, local PIC programs, local health departments.</p>	Department of Ecology	Non site-specific	1	
2018-0817	Protect and Restore Habitat: Fund Small Forest Owner Assistance	<p>Funding this request at \$500,000 for 2 FTEs within the DNR Small Forest Landowner Office (SFLO) will allow staff to educate and enroll small forest landowners into programs like Family Forest Fish Passage Program (FFFPP) and Forest Riparian Easement Program (FREPP).</p> <p>This request will provide small forest landowners with forestry technical assistance, including explaining forest practices application preparation and assisting with forest road repair and maintenance issues with a focus on reducing introduction of sediment into watercourses. Informing small forest landowners of incentive programs such as FFFPP to solve fish passage barriers and FREPP to offset the costs to small forest landowners for buffers required under the Forests and Fish law will help to incentivize good stewardship measures. Many of the small forest landowners are not subject to the same regulations as are larger landowners so these FTEs help educate small forest landowners about the incentive options.</p>	Department of Natural Resources	Non site-specific	1	
2018-0820	Puget Sound Fish Community Survey	<p>Puget Sound has a wide range of marine habitats and species that require a variety of survey techniques to be sampled effectively. Often surveys are designed to be species specific, resulting in data that may be biased toward certain habitat types, times, and/or species groups, often missing potentially important species interactions. The purpose of this NTA is to provide data about the Puget Sound fish community and food web dynamics that will provide context for research and monitoring programs by improving the spatial and temporal coverage of fish surveys in Puget Sound. Special attention will be given to sampling areas that have been under sampled and to using techniques that are appropriate for characterizing community structure (i.e. nearshore beach seining, and mid-water trawls).</p>	Department of Fish and Wildlife	Non site-specific	1	
2018-0821	Trans-boundary Vessel Traffic Safety Summit	<p>This NTA will: prevent & reduce the risk of major oil spills in the Salish Sea; increase protection for treaty rights at risk and for Puget Sound's natural resources. The existing treaty establishing the Canadian/US Cooperative Vessel Traffic Service requires comparable vessel safety and oil spill prevention & response standards in WA and BC. Currently there is no forum to evaluate comparability or to set strategic priorities for system improvements or transboundary cooperation. Several Tribes, industry groups, state & federal agencies, and stakeholders have recently expressed interest in establishing such forum. The summit will emphasize collective opportunities to reduce risks and strengthen regional response capacity. Priorities adopted at the summit will inform the work of state & federal regulators, Tribes, and industry best practices. This NTA improves several Vital Signs and safeguards other Puget Sound recovery investments by preventing & reducing the risk of major oil spills.</p>	Makah Tribe	Non site-specific	1	

2018-0827	Flexible and Cost-Effective Infiltration Testing Methods for Evaluating Shallow and Deep Infiltration Feasibility	The work will include the following elements: 1) Groundwater modeling to validate the borehole permeameter (BP) approach for a variety of facility configurations and subsurface conditions. 2) Shallow and deep infiltration testing to demonstrate and validate the BP approach. 3) Documenting the hydraulic conductivity (K) of Vashon-age Glacial Soils. 4) Evaluating potential groundwater impacts for a variety of infiltration scenarios and hydrogeologic conditions. 5) Preparation of a technical report documenting the work described above. 6) Preparation of an infiltration guidance manual for use by regulators, municipalities, and stormwater professionals.	City of Tacoma	Non site-specific	1	
2018-0829	Monitoring marine birds to improve estuary recovery practices	Marine bird populations are declining in Puget Sound and estuaries provide important habitat for a range of species. WDFW will build upon existing datasets and survey protocols for marine bird species to will improve the understanding of the importance of estuarine and nearshore habitat conditions and the effects of estuary and nearshore restoration practices on marine bird populations. These analyses will support the refinement and adaptation of management practices for habitat protection and restoration.	Department of Fish and Wildlife	Non site-specific	1	
2018-0831	Improving understanding of the magnitude and spatial variability of pinniped predation effects on Chinook early marine survival	Harbor seals are known predator of Chinook and other salmon smolts and predation is thought to be a major cause of early marine mortality. WDFW research will improve estimation of the magnitude and spatial variability of harbor seal predation to support the development of management actions. Research will identify Puget Sound hotspots of Chinook predator abundance with an emphasis on harbor seals. In addition, the effects of harbor seal predation on Chinook early marine survival will be evaluated accounting for both spatial variability in predator density and foraging activity as well as uncertainty in diet composition.	Department of Fish and Wildlife	Non site-specific	1	
2018-0853	Evaluation of Pollution, Identification, and Correction (PIC) programs	This study will gather the information of the PIC programs implemented around the Puget Sound drainage area to identify source techniques and BMP implementation that was successful in the opening of shellfish harvest area or known improvements to the receiving waterbody. PIC programs include multiple tasks that are developed in order to identify and control/eliminate the contribution of bacteria to the watershed. Instead of evaluating PIC programs on a local small project scale, the program has a whole should be evaluated to determine if the cost of the program implementation is delivering on the goals of maintaining water quality and the opening of shellfish harvesting areas. The success of PIC programs is important to ensure that the outcome is ongoing and sustainable. The analysis would also provide an overall assessment of effective BMPs specific to landuse, population density, infrastructure availability, and economics.	Department of Natural Resources	Non site-specific	1	
2018-0854	Ephemeral Sediment Data Collection	The overall goal of this proposal is to conduct analyses of sediment samples taken from 21 locations across seven DNR Aquatic Reserves and from 5 high risk sites on DNR managed lands located outside of the Reserves. This baseline data will be used to establish the foundation for the sediment component of a NRDA case in the event of an oil spill impacting one and/or several of these areas. A secondary goal of this project is to contribute sediment data to DNR's Aquatic Reserve's science monitoring program. The selected sample sites will be analyzed for; Total Organic Carbon (TOC), PSEP 1986; Polycyclic Aromatic Hydrocarbons, extended NOAA PAH list + C1-C4, EPA 8270D; (NWTPH-DX) Northwest Total Petroleum Hydrocarbon-Diesel with additional narrative if other hydrocarbon patterns are present, and Grain Size PSEP full characterization. Samples will be archived for future use until next round of sampling is conducted. For a full description of sampling design see Plan.	Department of Natural Resources	Non site-specific	1	

2018-0874	Coordination of nearshore habitat restoration and protection of harvestable shellfish resources	Nearshore habitat restoration project sites are often also important for harvestable shellfish resources. We will study potential impacts to shellfish resources from restoring natural processes at Duckabush Estuary (PSNERP proposal) and a reference site. WDFW & tribal shellfish staff currently monitor tidelands for shellfish harvest management. Expanding monitoring of shellfish to include data on recruitment, population dynamics, as well as physical factors e.g. salinity, sediment accretion or scour would assist in understanding potential impacts to shellfish resources from proposed habitat restoration work. We expect to add partners for this project to assist in data collection, analysis & collaboration before final submittal. This information is critical to advance nearshore habitat restoration in estuarine systems while protecting clam and oyster resources important for tribal and recreational fisheries.	Department of Fish and Wildlife	Non site-specific	1	
2018-0881	Reducing health risks of marine biotoxins and shellfish-associated illnesses in a changing climate	Our project will address threats to the health and well-being of Washingtonians that could increase with climate change, while strengthening local resilience and capacity by working with communities, local health jurisdictions, industry and tribal representatives, and the Washington State Department of Health to increase awareness of shellfish safety and to provide health advisories and closures when necessary. Improved risk communication would benefit the commercial shellfish industry (tribal and non-tribal), recreational harvesters, and all shellfish consumers through reduction of illnesses. An evaluation of risk communication gaps will identify barriers to message saturation among at-risk populations. We will use results to recommend changes to existing or the creation of new messages and tools to increase health risk awareness among shellfish harvesters and consumer audiences, including identifying opportunities for improved culturally and linguistically appropriate services.	University of Washington	Non site-specific	1	
2018-0884	Washington Sea Grant Crab Team	Washington Sea Grant's Crab Team, launched in 2015, fulfills the Washington Department of Fish & Wildlife (WDFW) mandate to monitor for European green crabs along inland Washington shorelines. We partner with more than 200 volunteers and dozens of agency and tribal staff to monitor a regional network of 52 sites that are highly suitable for invasion. Standardized citizen science protocols were designed in collaboration with regional green crab experts to increase the probability of detecting green crab at very low abundances and are implemented monthly April through September by trained monitors. Crab Team's network of sites focuses on pocket estuaries and salt marshes as the most suitable habitat for green crab, simultaneously assembling a long term dataset on shoreline habitat features and mobile fauna on an otherwise understudied habitat type. In addition, expertise and capacity offered by Crab Team supports WDFW's outreach and regional management strategies for this species.	Washington Sea Grant	Non site-specific	1	
2018-0885	Support Additional Reach-Scale Planning Efforts for Riparian Protection and Restoration in Puget Sound Agricultural Landscapes	<p>The Watershed LO manages an innovative riparian grant program, supporting the development of reach-scale plans to prioritize protection and restoration of riparian areas in agricultural landscapes in Puget Sound. Upon completion of reach-scale plans, the recipients are then eligible for pre-allocated implementation funds to acquire fee-simple interest or conservation easements for riparian areas, and to restore function of priority areas in these landscapes.</p> <p>We will select the 3 new partners for this program by managing a competitive solicitation for proposals. We will use the lessons learned in implementing the grant program to date to streamline planning and implementation efforts. The selected projects will result in 3 reach-scale plans that are well positioned to receive implementation funding from our LO or other capital funding programs. A separate NTA would provide additional implementation funds for priority actions identified in these plans.</p>	Department of Ecology	Non site-specific	1	

2018-0886	Marine Shoreline Design Guidelines: Engineering Technical Assistance, Training & Outreach 2020-22	The Marine Shoreline Design Guidelines (MSDG) was released four years ago to describe site analysis and selection of appropriate shore protection, when needed at all. WDFW encourages use of the MSDG to assure the range of options are considered, specific to the characteristics of the site. As a means of continuing to support MSDG as a design guideline and helping to familiarize non-designers with its concepts WDFW will develop and deliver a series of collaborative workshops, training sessions, and technical assistance for both design and non-design professionals and the restoration community. We will also develop complementary materials (worksheets, case studies) for MSDG to improve usability. Technical assistance to WDFW biologists has revealed that there are misconceptions regarding appropriate techniques for many designers. This NTA will increase capacity of conservation partners to use MSDG tools to assist landowners in considering appropriate options for bank protection.	Department of Fish and Wildlife	Non site-specific	1	
2018-0887	Further Investment in Implementing Riparian Protection and Restoration in Puget Sound Agricultural Landscapes	<p>The Watershed LO manages an innovative riparian grant program, supporting the development of reach-scale plans to prioritize protection and restoration of riparian areas in agricultural landscapes in Puget Sound. Upon completion of plans, recipients are eligible for implementation funds to acquire land or conservation easements in riparian areas, and to restore function of priority areas. A separate NTA will establish 3 additional focus areas that would also be eligible for implementation funding.</p> <p>Several of our grant recipients have identified more properties for protection than we can purchase with current funding. Through this NTA, we propose to increase investment in implementation funded through our existing or expanded grant program. We will engage the Habitat SIAT in funding decisions to ensure regional priorities inform project selection. Eligible costs include due diligence, appraisals, land or conservation easement purchase, and restoration of protected lands.</p>	Department of Ecology	Non site-specific	1	
2018-0890	Puget Sound Residential Wood Smoke Reduction	Residential wood smoke is composed of fine particulate, volatile organic compounds, Polycyclic Aromatic Hydrocarbons (PAHs) and other toxic pollutants of concern for fish in fresh and marine waters. These toxic pollutants can deposit directly into Puget Sound or on surfaces where they can be carried by stormwater into Puget Sound. This NTA proposes to reduce deposition of toxic air pollutants associated with residential woodsmoke by expanding an existing state woodstove change out program. This highly successful state program is focused and directed to communities at high risk of violating federal air quality standards. However, for many counties bordering Puget Sound this is not the case and funding has not been available. Ecology will report the estimated fine particulate emissions reduction benefit to the region from these projects.	Department of Ecology	Non site-specific	1	
2018-0896	Advancing Chinook Monitoring and Recovery Efforts in the Nearshore.	This NTA will implement a long-term management, sustainability and strategic plan for the Nearshore Geospatial Tool (Built on what is current in development with NEP current funding) in order to support Chinook recovery planning and monitoring in nearshore watersheds. Nearshore watersheds will receive direct support on application of the Tool to advance local recovery efforts. Pilot coordination efforts will happen in the San Juans, Island, and West Sound watersheds with eventual application across all nearshore areas.	Department of Fish and Wildlife	Non site-specific	1	
2018-0898	Puget Sound Clean Diesel Program	Diesel exhaust from freight transport and port equipment contains fine particulate, hydrocarbons, such as Polycyclic Aromatic Hydrocarbons (PAHs), and other toxic air pollutants harmful to fish in fresh and marine waters. Toxic pollutants in diesel exhaust can deposit directly into Puget Sound or on surfaces where they can be carried by stormwater into Puget Sound. This NTA proposes to reduce toxics entering Puget Sound by reducing diesel emissions related to Puget Sound port activity. It would build on an existing statewide-wide Clean Diesel Grant Program that has successfully reduced fine particulates that threaten public health and degrade environmental quality. Funding for this grant program is unstable and limited. This project would focus funding to replace, repower or upgrade diesel engines operating at Puget Sound ports with low emission or zero emission engines. Ecology will report the estimated fine particulate emissions reduction from these projects.	Department of Ecology	Non site-specific	1	

2018-0900	Marine Stormwater Treatment Standards			Non site-specific	1	
2018-0903	Shoreline Armor Vital Sign Indicator HPA Database Analysis	The Shoreline Armoring Vital Sign includes three targets for progress. The first indicator monitors the rate of new and removed shoreline armor length and is annually reported by WDFW. Information collected through project applicants and permit processing is analyzed using the WDFW Hydraulic Project Approval (HPA) database. This NTA would continue annual analysis of shoreline armor information available through the HPA database through 2020. WDFW provides this analysis to Puget Sound Partnership to assess progress toward Vital Sign indicator status, as well as share with restoration partners. As part of this project, WDFW would work with regional biologists to improve data in the HPA database or to collect additional metrics during HPA review. WDFW would participate in ongoing efforts to improve data for tracking shoreline armor and distribute shoreline armor information through outreach efforts e.g. workshop participation, website updates and conferences.	Department of Fish and Wildlife	Non site-specific	1	
2018-0908	Maintaining Up-to-Date Community-Scale Sea Level Rise Projections for Puget Sound	<p>Researchers at the UW Climate Impacts Group and Sea Grant have recently developed a set of probabilistic sea level rise projections for Puget Sound. The research team, through both NOAA and NEP funds, has devoted significant effort to piloting the use of these projections in planning and project design. These include planning and policy guidance, guidelines on restoration design, and capacity building for technical and non-technical staff.</p> <p>The science of sea level rise is changing rapidly. Recent research suggests a higher probability of rapid melt on Antarctica. Although this work is currently preliminary, ongoing research is likely to clarify the likelihood of accelerated ice sheet melt over the next few years. The purpose of this NTA is to produce a one-time update to the sea level rise projections that have just been produced, and use these updated projections to update guidance documents and engage with local and state agency staff to support the integration of these changes.</p>	University of Washington	Non site-specific	1	
2018-0909	Evaluating estuary and shoreline restoration through seabird distributions.	<p>The Puget Sound Seabird Survey is an ongoing study that has over 50,000 records from 120 survey sites, collected over eleven years. Powerful analysis methods, including Hotspot analysis and Distance Sampling modeling can identify trends, by species, within specific geographic areas. This can provide multiple views of restoration effectiveness, future restoration, and create a baseline status prior to future restoration. Major restoration projects such as in estuaries, or smaller projects such as reducing shoreline hardening could be related to the changes in trends in the location and use of habitat, by species.</p> <p>Data in this program have been collected trained citizen scientists throughout the Sound for many years. What is lacking are resources to conduct advanced analyses and relate the analyses to restoration efforts. Also, this valuable database needs to have resources for proper management and documentation.</p>	Seattle Audubon Society	Non site-specific	1	
2018-0915	Evaluating the role harbor porpoise predation in Chinook salmon early marine survival	The harbor porpoise has potential to be a salmon predator, especially on Chinook salmon. Harbor porpoise populations have increased at a rate of 9% per year over the past 10-15 years and its distribution in the Salish Sea has expanded dramatically. We know little about its diet although there are some efforts to assess the diet composition of bycaught animals. WDFW will expand upon this work using stable isotopes and fatty acid diet tracers to evaluate the contribution of juvenile salmonids (terrestrial signal) to the harbor porpoise diet relative to marine fishes. Using harbor porpoise population size estimates, the magnitude of this source of early marine mortality on Chinook salmon will be assessed.	Department of Fish and Wildlife	Non site-specific	1	

2018-0917	Tidal Water Crossing Structure Barrier Assessment, Prioritization and Design Guidelines Phase 2	Restoration priorities associated with fish passage barrier corrections along transportation corridors are largely based on proper identification of barriers to fish movement and a rapid assessment tool to allow comparison of barriers throughout the State. While these criteria are well developed for freshwater systems, application of similar criteria for intertidal is problematic. Therefore, prioritization of fish passage barrier remediation in the intertidal lags behind freshwater due to the difficulties both identifying and prioritizing barrier status, and developing appropriate design for remediation. Intertidal fish passage barriers are arguably the most important due to location in the watershed and impede not only anadromous fish access but also access to rearing habitat for juvenile salmonids. This NTA will build on ongoing studies to develop fish passage barrier assessment criteria, a "priority index" tool and design recommendations suited to the intertidal environment.	Department of Fish and Wildlife	Non site-specific	1	
2018-0921	Nearshore Geospatial Framework 2	The 2017 Nearshore Geospatial Framework, completed by Coastal Geologic Services and Western Washington University's Spatial Institute for the Puget Sound Partnership, suggested future directions to expand the project. This project demonstrated a systematic and semi-automated method for delineating marine bluff crests that will be used to map the entire Puget Sound region. Bluff heights will be referenced from LiDAR elevation data, and digitized buildings will enable setback distance calculations. Further data harmonization will create eelgrass and forage fish mapping that is both up-to-date and usable for spatial analysis. Real estate parcel mapping will be updated and extended to include tidelands parcels. These data refinements and similar analysis will facilitate planned salmon restoration and protection prioritization projects throughout the region.	Coastal Geologic Services, Inc.	Non site-specific	1	
2018-0923	Better Ground for Shellfish	This NTA will fill the gap that many Puget Sound Conservation Districts face in the technical implementation of best management practices under the Regional Conservation Partnership Program (RCPP), which does not include any outreach funding. By creating coordinated messaging under the Better Ground campaign (including videos, farmer series, earned media, and online learning), Puget Sound Conservation Districts can cost-effectively engage agricultural producers to enroll in existing incentive programs like RCPP.	Puget Sound Conservation Districts Caucus	Non site-specific	1	
2018-0931	Coastal Groundwater Impact Assessment for Coordinated Investment Planning	Despite that coastal groundwater levels and salinity that currently challenge farming and storm water management are expected to increase with sea-level rise and more intense precipitation quantitative data are sparse or lacking to advance and validate models for predicting future impacts. Initial studies in Skagit, Snohomish, Island Counties and Duwamish estuary indicate that tides propagate inland several kilometers to affect groundwater levels that are commonly < 1 m below the land surface. This work will establish cross-shore groundwater level monitoring arrays and integrate emerging models of the impacts of sea-level rise, storm surge and atmospheric rivers to model and map the spatial extent, timing, frequency and duration that groundwater and salinity will begin influencing important depth zones of the subsurface and pond above the land surface. The results will inform planning for estuary change, farm productivity and drainage costs, and storm water among other impacts.	US Geological Survey	Non site-specific	1	
2018-0937	Freshwater mussel surveys to identify ecologically important areas	Native freshwater mussels are long lived, filter feeders inhabiting streams feeding Puget Sound. They improve conditions for salmon and other native fish and enhance water quality. Freshwater mussels are one of the most imperiled groups of animals due to habitat destruction, pollution, and changes to water quantity. Also, their life histories are dependent on native fish species including salmon. Three species in WA are identified as Species of Greatest Conservation Need. These characteristics make them ideal to inventory as indicators of stream health and to identify ecologically important areas. We will survey streams feeding Puget Sound to collect baseline data on mussels. Surveys will occur at low water levels with quadrats or transects searching for live mussels and empty shells. All captured live individuals will be identified in the field and released unharmed. Baseline data will be used to identify ecologically important areas suitable for protection or restoration.	Department of Fish and Wildlife	Non site-specific	1	

2018-0938	Intertidal Habitat and Riparian Vegetation Model to Prioritize Recovery Planning	A synthesis and classification of existing and new data will be integrated with a 1-m digital elevation model of the Salish Sea planned for completion by USGS in summer 2018. Remote sensed and field mapping of vegetation (plant species/assemblages, density, height) and substrate metrics (type, elevation, roughness, drag coefficient) will help resource managers qualify metrics and quantify the extent that nearshore shoreforms currently provide spawning, nursery and rearing functions for Chinook and other salmonids, forage fish, Dungeness crab, oyster, clam, mussels, and diverse wildlife. Better quantification of these habitat and vegetation characteristics will advance metrics to track recovery beyond quantity to include quality and important functional traits. The results are also important boundary conditions for modeling future coastal climate change and vulnerability (e.g. drag coefficients of vegetation and mixed sediment beaches influence sea-level rise and wave impacts).	US Geological Survey	Non site-specific	1	
2018-0942	Transboundary Marine Safety and Oil Spill Prevention Forum	In 2016, the WA Dept. of Ecology hosted an oil spill risk mitigation workshop with invited stakeholders from both B.C. and Washington. The workshop participants identified nine recommendations for reducing the risks of oils spills in the Salish Sea -- the shared waters of WA and B.C. One of the top recommendations was to create a transboundary Harbor Safety Committee-like forum (Forum) that would address marine safety and spill prevention in the transboundary region. The Pacific States/B.C. Oil Spill Task Force (Task Force) was identified as the lead entity to facilitate discussions between WA and B.C. on scoping and creating this Forum. The Task Force has begun the process of engaging federal and state/provincial agencies in early planing discussions. The NTA funds would support ongoing forum support including staffing, facilitation, outreach, and meeting coordination among other activities. The full scope of work is in the process of being developed by WA ECY and B.C. Ministry of En	Pacific States/British Columbia Oil Spill Tas	Non site-specific	1	
2018-0943	Pursue Long-Term Funding for Nonpoint Water Quality Specialists to Protect and Improve Fresh and Marine Water Quality	<p>This NTA focuses on securing long-term funding for Ecology nonpoint water quality specialists to protect and improve fresh and marine water quality to restore and protect shellfish beds, improve Benthic Index of Biotic Integrity scores of lowland Puget Sound streams and improve watershed health to support salmon recovery.</p> <p>Reducing nonpoint source pollution through improved compliance and implementation of BMPs is crucial to Puget Sound recovery as highlighted in multiple priority Vital Signs and Regional Priorities.</p> <p>Ecology will pursue long-term funding options to ensure staffing levels necessary to fully address key Priority Vital Signs, support LIOs and local partners in their recovery efforts and accelerate Puget Sound recovery.</p> <p>Specialists will protect shellfish resources, improve BIBI scores and improve watershed health through implementation of watershed cleanup plans, increasing the use of BMPs on working lands and increasing compliance with environmental laws.</p>	Department of Ecology	Non site-specific	1	

2018-0944	Testing and validation of gravel beach morphology change model using new and existing beach monitoring data	<p>Work includes compilation of existing beach topography and wind/wave data, collection of new beach topography and wave data, and beach morphology change modeling. Compiled and collected data will be used alone and in combination with model results to:</p> <ul style="list-style-type: none"> - Update monitoring data collection protocols and update design guidelines for engineering of soft shoreline restoration projects. - Validate the model and develop protocols for using the model to assess future performance of proposed shoreline projects. - Update data collection and analysis protocols and engineering design guidelines for efficiently and effectively using beach morphology modeling to improve performance of armor removal and soft shoreline solutions in Puget Sound. <p>Sites evaluated in the study will be geographically diverse within Puget sound; sites that are part of an existing monitoring program will be given priority. Eight sites will be included in the study, as a minimum.</p>	Confluence Environmental Company	Non site-specific	1	
2018-0954	High-Resolution Estuary Mapping	<p>Much of the current estuary mapping relies on lower-resolution NAIP imagery. Limited drone-based (UAV or UAS) low-altitude mapping exists, but the use of remote sensing techniques such as supervised classification of vegetation communities would be a major improvement. Advances in multispectral imaging and "4D" aerial scanning provide an objective way to delineate tidal channels without hundreds of hours of digitization.</p> <p>Using skills built through the recent development of a shore armor mapping protocol, we will engage stakeholders to develop standards for estuary mapping and data products. Pilot sites may include recent or upcoming restoration sites, to enable landscape change analysis (e.g., Qwuloolt and Skokomish estuaries). Resulting mapping methods may be used throughout the Puget Sound region, with comparable results. These data products will be tailored for use with the SLAMM sea level rise tool, to identify vulnerable habitats and infrastructure.</p>	Coastal Geologic Services, Inc.	Non site-specific	1	
2018-0969	Regulatory Harmonization for Salmon Habitat Protection and Restoration - Phase III: Regional Application to Puget Sound	<p>Phase III of a multi-phase NTA to harmonize regulations and recovery actions in support of salmon habitat includes the following tasks:</p> <ol style="list-style-type: none"> 1) formalize the methods and decision support tool for regional application at different scales in Puget Sound; 2) confirm key attributes and measurable indicators of salmon habitat and other co-benefits that link to existing regulations for different ecosystem components (uplands, floodplains, nearshore, small streams, large streams, riparian, etc.); 3) enhance the EMDS Open Framework to make it easier to incorporate third party tools. 4) identify and leverage existing cloud technology in support of the EMDS Open Framework; and 5) work with collaborators to develop workshops and educational materials for teaching people how to use, contribute, and learn how to work with the EMDS Open Framework and toolsets. 	The Tulalip Tribes	Non site-specific	1	
2018-0973	Pollution Identification and Correction Training Academy	<p>Our proposal focuses on secondary professional training for environmental health staff, college students and veterans entering the work force in Pollution Identification and Correction (PIC) techniques through a PIC Training Academy. ♦The curricula would cover shellfish, onsite sewage system failures, livestock waste management, stormwater illicit discharge, pet waste, parcel assessment, parcel inspection, dealing with difficult people, outreach, chain of custody, water quality complaints, water quality monitoring, source tracking, wildlife source investigation, waste water treatment plants, boats, recreational vehicles, homeless encampments, and hot spot investigation. ♦The final element of the training would be a project whereby the students would develop and implement a water quality restoration or prevention project. ♦</p>	Washington Sea Grant	Non site-specific	1	

2018-0974	SoundToxins: Partnership for monitoring Harmful Algae in Puget Sound	<p>The goal is a cost-effective monitoring program to provide sufficient warning of HAB events to enable early or selective harvesting of seafood, thereby minimizing risks to human health and reducing economic losses to Puget Sound fisheries.</p> <p>To accomplish this, seawater samples are collected weekly by participants throughout Puget Sound with additional sites being added at new sites of importance. The samples are analyzed for salinity, temperature, nutrients, chlorophyll, phytoplankton species, and marine biotoxins. Phytoplankton species diversity is described and the four target HAB species are specifically identified and enumerated. These target species are Pseudo-nitzschia species, Alexandrium catenella, Dinophysis species, and Heterosigma akashiwo. An interactive database and mapping allows for natural resource managers to alert to accumulating harmful species.</p>	Washington Sea Grant	Non site-specific	1	
2018-0140	Discovery Farms & Agricultural Best Management Practice Effectiveness	<p>A great deal of interest has been expressed at multiple levels of state and local government and among the environmental and tribal communities in Puget Sound about the effectiveness of agricultural best management practices utilized by USDA NRCS, the WSCC, and conservation districts. This NTA will establish a region-wide initiative to set up Discovery Farms representing the breadth and variation of agricultural operations in Puget Sound to test and monitor the effectiveness of commonly implemented best management practices to address bacterial and toxics pollution. The collected data will be made available to help decision makers shape public policy and inform adaptive management actions to accelerate the agricultural sector's contribution to the recovery of Puget Sound. This NTA directly addresses the regional priority approach Shell1.4 in working to address bacterial runoff from working lands and farms.</p>	State Conservation Commission	Site specific	1	
2018-0157	Conservation Reserve Enhancement Program (CREP) Expansion	<p>The Conservation Reserve Enhancement Program (CREP) is a joint federal and state funded program that restores riparian (streamside) habitat and protects that habitat for 10-15 years. This NTA proposes to expand CREP implementation in the Puget Sound by: conducting an assessment of rivers/streams region-wide where CREP buffers will produce the greatest benefit and increasing program participation by landowners. This NTA will also identify landowner motivations to develop and implement strategies and identify CREP landowners who would likely be incentivized to participate and the additional funds required for incentives to inform future budget requests. A pilot project in a select watershed is also planned based on the above analysis. This proposal addresses the Habitat Strategic Initiative regional priorities and approaches by facilitating the increased use or performance of BMPs in working/rural lands (BIBI3.1) by reducing the impact of runoff from working lands.</p>	State Conservation Commission	Site specific	1	
2018-0158	Puget Sound Livestock Stewardship for Shellfish	<p>Shellfish are a vital and essential part of the Puget Sound culture and economy. Shellfish regional priority and approach Shell1.4 is the focus of this NTA. The SCC and conservation districts region-wide will focus expanded efforts to increase implementation of agricultural best management practices to address runoff from farms to benefit shellfish growing areas. Specific shellfish growing area watersheds are selected based on data provided by WDOH with local partner input/participation and may include: Samish Bay, Portage Bay, and Hood Canal shellfish growing areas. Expanded efforts include a regionally coordinated education and outreach campaign to increase awareness of their potential impacts on water quality, incentivizing increased adoption and implementation of agricultural BMPs to address bacterial runoff, and implementation monitoring of all installed practices at annual intervals to ensure long-term commitment to proper waste handling.</p>	State Conservation Commission	Site specific	1	

2018-0208	MyCoast: The Statewide Citizen Science Reporting APP.	The Washington Department of Natural Resources in partnership with the Northwest Straits Commission and the Snohomish County Marine Resources Committee will launch a statewide version of the MyCoast app. MyCoast is a portal for the collection and analysis of pictures and data related to marine debris and shoreline change. Information collected through the application will be used to visualize the impact of nearshore hazards and to enhance awareness among decision-makers and stakeholders. Information includes documenting creosote-treated marine debris, capturing beach change, evaluating storm surge, tracking abandoned vessels, and tracking the highest tides in the region. This NTA will fund the expansion of the MyCoast application to the Puget Sound region.	Department of Natural Resources	Site specific	1	
2018-0209	Planting trees to increase stormwater infiltration.	Conversion of land cover for residential, commercial and industrial use and transportation continues to increase in communities throughout the Puget Sound, resulting in significant increase of impervious surface and stormwater runoff that threatens the health of salmon bearing streams and ultimately Puget Sound. Integrating trees as green stormwater infrastructure (GSI) contributes to stormwater runoff mitigation. Urban trees, especially large conifers in open areas of parks and natural areas, are effective GSI elements that also provide multiple environment and social benefits. A report of a sample inventory of 33,617 trees west of the Cascades at 15 locations reported that trees captured and reduced 45.2 million gallons of stormwater runoff. The functional capacity of trees to mitigate runoff was valued at \$2,712,917. The project inventories tree canopy within communities in areas of low canopy, where planting investments will increase canopy and the capacity to mitigate runoff.	Department of Natural Resources	Site specific	1	
2018-0219	Shoreline Restoration Effectiveness Monitoring	This NTA expands data collection to determine shore armor removal effectiveness on improving ecological conditions at local and landscape/regional scales. Assessments include three beach types: restored beaches that have had armor removed; armored beaches; and reference sites. Pre- and post-construction monitoring has occurred at 12 armor removal sites around Puget Sound, however most received only one year of post-construction data collection. This program adds new sites and continues data collection at previously monitored sites. Parameters include: photo points, large woody debris and beach wrack composition, forage fish spawn surveys, beach profiles, sediment composition, wrack invertebrates, riparian vegetation, and terrestrial insects. Trained citizen-scientists will assist WDFW, UW, NWSF, and Friends of the San Juans experts using Shoreline Monitoring Toolbox and WDFW forage fish protocols. Results will be included in the new Shoreline Monitoring Toolbox database and Sound IQ.	Northwest Straits Foundation	Site specific	1	
2018-0281	Puget Sound Conservation Districts Engineering Support for Habitat Restoration	PSCDs will expand their capacity to provide habitat restoration engineering services by creating a new environmental engineering staff position for supporting implementation of PSP's salmon, estuary, and shoreline armoring regional priorities. The position will be supervised by the Skagit Conservation District's existing habitat engineering program in Mount Vernon, but will support the needs of all twelve PSCDs. Building on the PSCDs' existing relationships, the engineer will work directly with landowners as well as indirectly through projects managed by our partners in non-profit organizations and tribal and government natural resource agencies. The work will focus on identifying and designing projects for fish passage barrier correction, in-stream salmon habitat complexity, nearshore restoration, shoreline armoring removal and other habitat engineering needs. NTA funding will be used to hire an engineer and purchase surveying equipment and a CAD software license.	State Conservation Commission	Site specific	1	
2018-0305	Permeable Pavement Standards Development Based on Lessons Learned	See executed agreement.	City of Tacoma	Site specific	1	

2018-0335	Evaluation of Exposure to Endocrine Disrupting Compounds in Marine Mussels through a Combination of Chemical and Biological Measures	Understanding the exposures and effects of endocrine disrupting compounds (EDCs) is a regional priority for marine monitoring. In response, this NTA will characterize EDC exposures and biological response in mussels, leveraging a species already in use for contaminant monitoring, collected at priority Puget Sound nearshore locations. We will gain chemical exposure information through high-resolution mass spectrometry methods, allowing a broad characterization of the occurrence of organic compounds, including EDCs, in tissue samples. We will evaluate endocrine disruption by measuring a suite of genetic biomarkers identified as important parts of the response pathway in mussels. This unique combination of chemical and genetic data will improve understanding on the extent of EDC exposures (how broad is the problem? and, where is it occurring?) while supporting the identification of known and (currently) unknown compounds, critical in forming the basis of an effective management response.	University of Washington Tacoma	Site specific	1	
2018-0418	Puget Sound Conservation Districts: Regional Shoreline Program Expansion	This action helps marine waterfront homeowners adopt Shore Friendly principles across Puget Sound. Six leading Conservation Districts will host collaborative, co-branded programs offering technical assistance and education to facilitate behavior change. By providing site-specific guidance, resources, and incentives, the programs will (1) increase armor avoidance, removal, and use of SSP alternatives, and will (2) enable homeowner adoption of behaviors that protect shoreline habitats and processes. Three existing programs will enhance services, using updated prioritization tools; increasing focus on avoidance strategies; and providing expert support to three new programs. New armor removal projects will be identified and developed; previously designed projects will be built. Success will be measured via the number of participating homeowners; miles of shoreline assessed; number of stewardship BMPs implemented, and the number of armor removal/SSP projects developed and/or constructed.	Puget Sound Conservation Districts Caucus	Site specific	1	
2018-0427	Addressing Ocean Acidification in Washington: Monitoring, Forecasting, Biological Response Experiments, and Regional Coordination	<p>1) Sustain the ocean acidification monitoring network to measure trends in local acidification conditions and related biological responses to allow detection of local acidification conditions and increase our scientific understanding of local species responses.</p> <p>2) Ensure continued water quality monitoring at the six existing shellfish hatcheries and rearing areas to enable real-time management of hatcheries under changing pH conditions.</p> <p>3) Sustain the real-time short-term forecasts of corrosive conditions for application to shellfish hatcheries, growing areas and other areas of concern and its access to the public, allowing shellfish growers and managers to track acidification.</p> <p>4) Conduct laboratory studies to assess the direct causes and effects of ocean acidification on Washington's species and ecosystems, focused on determining the biological responses of species of ecological, economic and cultural significance.</p>	University of Washington	Site specific	1	
2018-0442	Effectiveness of regulatory mitigation to preserve critical salmon habitat in Puget Sound	<p>Projects that affect the nearshore environment often require mitigation to achieve no net loss of habitat function. However, there is little information on the effectiveness of mitigation measures, especially as it pertains to preserving critical salmon habitat in Puget Sound.</p> <p>We will develop a database of past and current projects that require eelgrass mitigation, a valuable habitat for out-migrating Chinook salmon in Puget Sound. Scientific literature indicates that eelgrass mitigation projects tend to have high failure rates that could result in net habitat loss. This could affect salmon foraging and migration. We will survey a sample of these projects to determine mitigation success over varying spatial and temporal extents throughout the Sound. Results will identify the success of the mitigation process and the effectiveness of regulations to achieve no net loss of habitat.</p>	Department of Natural Resources	Site specific	1	

2018-0446	The Beach Environmental Assessment, Communication, and Health (BEACH) Program Bacterial Assessment at Recreational Swim and Shellfish Beaches	The BEACH Program will conduct two years of weekly monitoring for fecal indicator bacteria at public saltwater swimming and shellfish beaches from Memorial Day through Labor Day. Bacteria data collected will provide information on the status of recreational shellfish beds, including information on improving or worsening bacterial levels. Bacterial water quality in recreational harvest areas are indicative of bacterial water quality in commercial and tribal shellfish harvest areas since the majority of recreational shellfish beaches are adjacent to these harvest areas. BEACH Program staff and local BEACH Partners will conduct weekly monitoring for Enterococcus (a fecal bacteria) and bi-weekly for fecal coliform bacteria. This type of monitoring scheme will provide early warning to PIC Programs, DOH, local Tribal Nations, and local health jurisdictions on bacteria trends at their recreational shellfish beaches, and nearby commercial and tribal shellfish areas.	Department of Ecology	Site specific	1	
2018-0448	Respiration measurements in the Salish Sea	The Salish Sea Model will be employed to assist with the development of nutrient management and water quality strategies for the Puget Sound. This project will help optimize model performance, and minimize uncertainty in predicted dissolved oxygen levels. Model uncertainty depends on the availability of relevant observations and the proposed expenses will allow us to leverage an existing study for sampling. This project proposes to measure the key parameters ultimate carbonaceous biochemical oxygen demand and oxidation rate constant, which is an integral calibration parameter in the Salish Sea Model. It is well recognized that organic carbon loadings into the Sound have a direct impact on the decay rates and mineralization processes directly linked with dissolved oxygen and carbonate system variables in the water column. This project measures a key parameter that the model uses - the rate constant for oxidation of dissolved organic carbon, also known as biochemical oxygen demand.	Department of Ecology	Site specific	1	
2018-0470	Fireproof Killer Whales: Eliminating Flame Retardant Contaminants to Puget Sound	<p>Conduct flame retardant testing, surveillance and monitoring to better understand which toxic chemicals are currently being used in products that bioaccumulate in people as well as Orcas to reduce sources.</p> <p>Flame retardants are release from households to wastewater treatment plants as a major pathway to Puget Sound. Atmospheric deposition and surface runoff have been identified as pathways for PBDE contamination in aquatic systems.</p> <p>The project will:</p> <ol style="list-style-type: none"> 1) Enforce the ban on the use of certain flame retardants that impact wildlife and people through the product testing. Assess other product categories where compliance is unknown. 2) Focus on impacted communities through environmental justice actions, including screening upholstered furniture in home that may contain flame retardants, including take back programs. 3) Identify policy options, conduct toxics in fish monitoring, labeling or restrictions. 4) Inform consumers in multiple languages. 	Department of Ecology	Site specific	1	

2018-0472	Clean Cars Alternatives Assessment	<p>This NTA leverages the research findings from the Puget Sound Clean Cars Stormwater Partnership (NTA 2016-0284).</p> <p>The partnership will collaborate to prioritize and conduct chemical hazard assessments to identify and use safer alternatives to priority toxic chemicals currently found in lubricants, fluids and other specialty automotive products.</p> <p>Partners: Gradient, Society of Automotive Engineers, UW, WSU, Clover Park CC, Motor & Equipment Manufacturers Association (MEMA), Auto Care Association, Seattle Public Utilities, WA DOT, Puget Soundkeeper, Bridge Latino.</p> <p>The results include conducting at least three chemical hazard assessments of high priority chemicals of concern to Puget Sound. The output includes 30-60 chemical hazard profiles that can be used by manufacturers to reformulate safer products.</p> <p>Outputs: At least three chemical hazard assessments on automotive products; 30 hazard assessments depending on available funding.</p>	Department of Ecology	Site specific	1	
2018-0473	PCBs in Building Products	<p>This project will implement the following PCB CAP recommendations to: 1) work with building owners to prevent PCBs currently in building materials from being released into the environment; 2) Provide education and outreach on BMPs to building owners, local governments and those in the building trades; and 3) Promote the EPA PCB Facility Approval Streamling Toolbox (FAST): Streamling the Cleanup Approval Process.</p> <p>The actions include partnering with EPA Region 10 to enforce current TSCA regulations and provide BMPs to school districts and building owners.</p> <p>Partners: EPA Region 10, Industry, local governments, tribal governments, nongovernmental organizations, federal and state agencies, and public.</p> <p>Outputs: Pounds of PCBs safely managed, EPA permit approvals</p>	Department of Ecology	Site specific	1	
2018-0474	Local Source Control Implementation	<p>1) Fund local source control specialists to conduct small business site visits to reduce polluted stormwater and toxic threats to Puget Sound. Local Source Control (LSC) is "boots on the ground" small business assistance delivered by local jurisdictions to find and fix problems related to improperly stored products/toxic wastes, improper waste disposal, spills of toxic chemicals, and improperly maintained storm drains. The outcome is to conduct at least 40,000 site visits by June 30, 2022.</p> <p>2) Add new local source control programs in threatened watersheds and underrepresented communities from existing land use and activities that have the potential to release pollutants to stormwater systems.</p> <p>3) Add new source control monitoring capacity to assist local jurisdictions in identifying and prioritizing toxic hot-spots, emerging contaminants or impacted watersheds.</p> <p>4) Develop FY19-21 budget decision package to the state legislature for ongoing local source control funding.</p>	Department of Ecology	Site specific	1	

2018-0496	Improved Treatment of Phosphorus in Stormwater	Elevated levels of phosphorus in surface water runoff can negatively impact freshwater lakes and sensitive receiving waters, resulting in eutrophication and the increased likelihood of harmful algal blooms. Effective treatment options are limited. We have identified a low cost media (known as WTR), derived from a waste product of drinking water treatment systems, that can control phosphorus when incorporated into a properly designed system. Media effectiveness has thus far been demonstrated in the laboratory. Under this NTA we would incorporate the media into a set of field systems for longer term testing and evaluation. The approaches would include bioretention systems and bioswales, and would be selected in coordination with local and regional agencies. Testing would be performed to characterize treatment effectiveness (e.g., P removal) and characterized important design parameters (loading rate, adsorption capacity, etc.)	University of Washington	Site specific	1	
2018-0575	Puget Sound-wide Zooplankton Monitoring Program	The Puget Sound-wide Zooplankton Monitoring Program provides local resource management agencies with best available science to guide decision making in the marine environment and implements a critical component of a coordinated, integrated ecosystem monitoring program. Zooplankton monitoring is a cost-effective, efficient means to understand how changes in the local vs. oceanic physical environment translate up the food web, and provide improved forecasting tools and guidance towards management decisions to set harvest expectations and optimize recovery strategies. Continued sub-basin monitoring is necessary to understand differences between distinct sub-basins and link those differences to upper trophic level issues like salmon survival and forage fish abundance. This funding request is to continue the monitoring program uninterrupted and maintain its integration with long-term monitoring, management and recovery efforts of the Puget Sound Ecosystem Monitoring Program (PSEMP).	Department of Fish and Wildlife	Site specific	1	
2018-0594	Watertyping The North Olympic Peninsula	This NTA involves local field work and groundtruthing of streams listed as Non-Fish bearing on state maps. Evidence has shown that 40-60 percent of these maps are in error, which limits effective habitat protections on these streams. This results in lessened buffers and non-protection of these streams and the fish using them. Local governments in Washington state frequently use these WDNR water type maps, but do not have the resources to validate their accuracy in land use planning and permitting. These WDNR maps were done years ago, with older technology and tools and no groundtruthing. The tools existing today are much more sophisticated and on the ground work provides a much better picture of which streams are actually fish-bearing. The North Olympic Peninsula Lead Entity for Salmon and partners will receive training before beginning this work and mentoring when needed during the project from the Wild Fish Conservancy which is experienced in doing this work throughout Washington.	North Olympic Peninsula Lead Entity	Site specific	1	
2018-0616	Puget Sound Stream Simulation Culvert Effectiveness Monitoring	WDFW protects fish habitats by regulating the construction of both new and replacement culverts. To determine whether new culverts perform as intended, WDFW has initiated a monitoring program to advance our understanding of culvert designs based on a geomorphic approach (no-slope and stream simulation). This approach is intended to maintain channel processes through the entire structure over its entire service life. This NTA would build on the program by coordinating with local governments to monitor new culverts. For example, Snohomish County is partnering with WDFW on how to best assess stream simulation culvert performance in a repeatable and cost effective manner. WDFW would work with the county to test a new culvert rapid assessment tool based on easy to collect field data. In addition to providing counties with their own implementation and effectiveness monitoring approach, the results of this work will be used to advance culvert research and guidance for future projects.	Department of Fish and Wildlife	Site specific	1	

2018-0700	Salish Sea Marine Survival Project: Synthesis and solutions testing	The Salish Sea Marine Survival Project is a US-Canada effort to determine the primary factors affecting the survival of juvenile salmon and steelhead in our combined marine waters of Puget Sound and Strait of Georgia. Long Live the Kings, Pacific Salmon Foundation and our partners raised over \$20 million to conduct the exploratory research needed to build focus around factors to address or manage. Research concludes in early 2019. Through 2019, we propose to finish synthesizing project results, then identify and recommend specific management & recovery actions at a regional scale. Synthesized results will be communicated to managers & the general public. Subsequently, in 2020, we will begin testing specific corrective actions. Through affiliated NTA 2018-600, we plan to work with watershed leads to integrate results into their recovery plans. Other affiliated NTAs are 2018-0573, 2018-0575, & 2018-0602 to directly address pinniped predation, zooplankton monitoring, & Atlantis modeling.	Long Live the Kings	Site specific	1	
2018-0701	Forest Health Management for Reduced Stormwater Runoff and Land Conversion	The goal of this NTA is to help private forest landowners meet ecosystem restoration priorities by 1) Identifying priority areas for targeted delivery of forest health management (FHM) services within the boundary of each Puget Sound conservation district (PSCDs). 2) Marketing FHM services to forest landowners within the priority areas. 3) Packaging and distributing standardized FHM planning and implementation protocols to the 12 PSCDs to deliver FHM services PS-wide at a base-line capacity-level. 4) Preparing Forest Stewardship Plans (FSP) that meet the WA State Integrated Forest Management Plan Guidelines. 5) Providing and financial incentives (e.g., cost-share, enrollment in state and local current use programs) to implement restoration activities included in FSPs (e.g., weed control, forest structure / canopy restoration, tree / shrub establishment, road abatement, fish passage barrier removal). And 6) Promoting other incentives that reduce or prevent land conversion (e.g., TDRs).	San Juan Islands Conservation District	Site specific	1	
2018-0721	Engagement of state and local governments in basin-scale Puget Sound modeling and restoration planning	EPA-ORD, Pacific NW National Laboratory, Long Live the Kings, NOAA NW Fisheries Science & The Nature Conservancy are developing an integrated environmental & human systems modeling framework for whole-basin Puget Sound restoration planning. Primary environmental models include a terrestrial ecohydrology model (VELMA), an ocean circulation model (Salish Sea Model), and an ocean food web model (Atlantis). The linked models will capture the propagation of impacts throughout the terrestrial-marine ecosystem. This environmental subsystem will be linked to a human subsystem (e.g., Envision) to simulate actions of human decision-makers. This NTA will engage state & local governments (ECY, LIOs, etc.) in building ecosystem management scenarios that will allow managers to play out ecological, social & economic consequences of alternative restoration choices across multiple scales. Modeled restoration targets will include high priority Vital Signs such as salmon & water quality/quantity.	US EPA	Site specific	1	
2018-0753	Shellfish Growing Area Water Quality Improvement	The Washington State Department of Health (DOH) will use their growing area classification information to evaluate current marine water quality information and potential pollution sources in the watersheds to create a prioritized list of impacted shellfish harvesting areas. DOH will work with state, local, and tribal partners to develop coordinated pollution identification and correction projects within these areas. DOH will develop a solicitation for state agencies, local agencies, and tribes to implement projects aimed at identifying and correcting pollution sources in the impacted areas.	Department of Health	Site specific	1	
2018-0756	Shellfish Growing Area Water Quality Protection	The Washington State Department of Health (DOH) will use their growing area classification information to evaluate current marine water quality information and potential pollution sources in the watershed to create a prioritized list of shellfish harvesting areas threatened with a classification downgrade. DOH will work with state, local, and tribal partners to develop coordinated projects within these areas aimed at maintaining and fixing treatment systems and finding and fixing pollution sources to assure shellfish harvesting areas are not downgraded. DOH will develop a solicitation for state agencies, local agencies, and tribes to implement projects within the impacted areas.	Department of Health	Site specific	1	

2018-0757	Performing sediment sampling on State-managed aquatic land to identify leasing adaptive management techniques to reduce impacts on aquatic habitat.	To identify effects that certain leasing activities can have on aquatic habitats, DNR would like to perform sediment sampling on state-managed aquatic land. Management of state-managed aquatic land has been a process that identifies best management practices and incentives to encourage exceedance of regulatory requirements. Certain leasing activities can contribute to the slow degradation of an area that cause prohibition of shellfish harvesting, limit recreational activities, and damage aquatic environments. Sediment sampling would include a limited set of parameters that would be relevant to the activities and possible pollutants that could affect aquatic land health. Sediment sampling would continue to collect data in these areas of citizen activity. The overall goal of the work is to study whether or not the current leasing agreements are protective of sediments in the area, and if not, manage the requirements to encourage implantation of additional BMPs.	Department of Natural Resources	Site specific	1	
2018-0761	Evaluate Use of MS2 Coliphage as Viral Pathogen Indicator in Shellfish Tissue and Water	This NTA will develop capacity for Health and its partners to evaluate temporal, geographic, and interspecies variability of viral indicator concentrations in shellfish tissue and marine waters. This NTA consists of three parts: 1. Provide funds for start-up costs of running test at Public Health Lab (PHL) in Shoreline. 2. Conduct a limited number of studies in areas of Puget Sound deemed vulnerable to contamination from human sewage, as well as background areas where no potential human sewage impacts are expected. 3. Evaluate viral loading from selected wastewater facilities under various hydraulic loading scenarios, including flow blending. Success will be measured by increased laboratory capacity to conduct MSC test, and knowledge of viral loading and pollution source identification in various areas.	Department of Health	Site specific	1	
2018-0785	Identification of Puget Sound's nearshore habitats where forage fish embryos and larvae exhibit the greatest risk of impaired health related to toxic contaminants from nearshore pollution sources	Developing embryos of Pacific herring and other nearshore spawners are exposed to a wide range of toxic contaminants during this critical and sensitive life stage. Chemicals from stormwater and other sources can kill embryos and cause sub-lethal developmental defects which can impair health and reduce survival of larvae. Using data from WDFW's Puget Sound Mussel Monitoring program to identify known areas of stormwater pollution, this project will compare contaminant exposure and toxicopathic developmental defects of herring embryos across a wide range of contaminant exposure scenarios. We will sample naturally-spawned embryos from Cherry Point, Elliott Bay, Port Orchard/Madison, Squaxin, Quilcene., and other known spawning habitats, and transplant manually-spawned embryos to other habitats to evaluate potential stormwater contamination effects on this sensitive life stage, and to pinpoint nearshore areas of highest concern for contaminant abatement.	Department of Fish and Wildlife	Site specific	1	
2018-0803	Floating Treatment Wetlands Reduce Contaminants & Nutrients in Urban Stormwater Runoff	Phase I of this project is funded by the King County Council and will take place in 2018. If FTWs are found to be successful in reducing prespawn coho mortality, (following the Spromberg et. al, 2015 study) Phase II and Phase III are as follows: Phase II - 1) test 2nd sample of coho for mortality from direct stormwater with and without FTW 2) determine which PNW native emergent species perform the best with regard to metal and nutrient uptake (phytoremediation) and which continue to grow into the fall when coho return 3) determine if harvesting the above water surface and below water surface plant material will assist in providing removal of nutrients and metals from the water body 4) examine the fate of metals and nutrients (plant roots, shoots, biofilm) Phase III 1) conduct field pilot studies of FTWs within three receiving water bodies in Puget Sound urban areas by measuring the metal and nutrients in stormwater prior to FTW exposure and after FTW exposure.	University of Washington	Site specific	1	

2018-0813	Protect and Restore Habitat: Enhance the Forestry Riparian Easement Program (FREP)	<p>FREP helps to keep small working forests on the landscape by purchasing conservation easements for working forestlands disproportionately affected by the Forests and Fish law. Funding FREP at \$3.5M for 3 FTEs will purchase 30 conservation easements and determine the easement values of 20 applications.</p> <p>FREP serves to deter conversion to non-forestry uses in areas of immediate risk. FREP supports efforts outlined in the Land Development and Cover priorities by protecting essential riparian habitat adjacent to fish bearing streams and engaging private land owners in Puget Sound protection and recovery. FREP increases acquisition of important habitats by compensating small forest landowners for the value of trees in riparian areas and associated unstable slope buffers.</p>	Department of Natural Resources	Site specific	1	
2018-0822	Develop and coordinate volunteer citizen science and K-12 education program to monitor local aquatic habitat effects from climate change	<p>Scientists in DNR's Aquatic Assessment and Monitoring Team have been working to recruit volunteers to help maintain uninterrupted continuous data collection for the Acidification Nearshore Monitoring Network (ANeMoNe). This requires dedicated individuals to regularly (monthly) visit the sites located from Willapa Bay to Cherry Pt to check sensors, clean any biological fouling, dig out any covered in sediment, and check that deployments lines and anchors are secure. The deployed sensors will have to be swapped out quarterly with calibrated, cleaned sensors and charged batteries. In the spring, summer and fall, eelgrass density, shorebird habitat use, shellfish spat settlement, and water samples will be collected. We would like to engage K-12 schools through development of grade-level appropriate science curriculum with hands-on field data collection. We propose support to coordinate citizen science volunteers and develop a K-12 education program on local effects of climate change.</p>	Department of Natural Resources	Site specific	1	
2018-0823	Collect species use of nearshore habitat types using eDNA to assist in identifying ocean acidification refuge sites	<p>We propose to conduct eDNA analysis on water samples from ANeMoNe sites collected in eelgrass and bare mudflat to inventory the species present in the different habitat types. This information together with continuous monitoring of water quality parameters including pH, DO, salinity, temperature and chlorophyll will provide essential information for determining ocean acidification refuge sites.</p>	Department of Natural Resources	Site specific	1	
2018-0824	Clone stress-resilient eelgrass populations to support restoration efforts throughout Puget Sound	<p>Micro-propagation of select eelgrass populations from plants collected throughout the Puget Sound and the outer coast estuaries. These populations have been characterized for their resiliency to environmental stressors such as desiccation, thermal extremes, shading, and sediment composition. Plants will be cultured through cloning from plant tissue samples in DNR's Marine Aquatic Vegetation Experimental Nursery</p>	Department of Natural Resources	Site specific	1	
2018-0845	Protecting Channel Migration Zones in Puget Sound	<p>We propose to work with local governments in three Puget Sound Counties to develop and test procedures for delineating channel migration zones (CMZs) on fish-bearing streams (less than 20 cfs mean annual flow) using existing topographic and LiDAR maps, remote sensing technologies for creating new digital elevation products, and application of existing field methods (WA Depts. of Natural Resources and Ecology). By demonstrating cost effective methods, we can meet the intent of the PHS guidance and remove barriers to implementation of best available science to protect aquatic systems under the Growth Management Act. Further, WDFW can better equip its technical assistance biologist to assist other counties in updating critical areas ordinances protection measures for riparian ecosystems.</p>	Department of Fish and Wildlife	Site specific	1	
2018-0864	Assessment of Toxic Chemicals in Puget Sound Basin - updating the 2007-2011 Puget Sound Toxics Loading Analysis	<p>Update the loading study to determine the estimated loading of priority chemicals and emerging contaminants. The study will examine</p> <ul style="list-style-type: none"> - Where the toxic chemicals come from. - How much is being delivered to Puget Sound. - The delivery pathways that contribute to toxic loads to Puget Sound. - The relative importance of these chemicals based on their toxicity. 	Department of Ecology	Site specific	1	

2018-0866	Green Innovation: Reducing Impacts of Microplastics in the Marine Environment	<p>Conduct green chemistry research, awards and incentive programs to foster the development of sustainable plastics.</p> <ul style="list-style-type: none"> - Characterizing microplastics in the marine environment. - Recommend test methods that can be used to screen for truly degradable plastics in the marine environment. - Research chemical selection and additives. - Explore waste management options to mitigate microplastics from textiles. - Research strategies for reducing plastics to water bodies by summarizing the top plastics emitted to water, types of products associated with those plastics and opportunities to substitute those product with different chemicals, materials or processes. - Conduct a green polymer challenge project. 	Northwest Green Chemistry	Site specific	1	
2018-0893	Surf Smelt Habitat Tidal Range	<p>This study will enhance our understanding of Surf Smelt and Sand Lance spawning beaches by quantifying environmental parameters associated with spawn abundance, distribution and egg survival. We will resample a subset of sites, based on prior spawn detections, representing a range of high and low egg presence and survival rates across a wide variety of environmental conditions. We will evaluate environmental parameters such as tidal range, beach sediment, beach slope, beach width, aspect, fetch, upland encroachment, and shoreline use (i.e. infrastructure) at the site, reach and drift cell to advance our understanding of how shoreline process, structure and function are related to priority habitat for forage fish.</p>	Department of Fish and Wildlife	Site specific	1	
2018-0902	Shoreline Armor Implementation, Compliance and Effectiveness Monitoring	<p>The 2014 TACT report identified several key marine shoreline armor HPA permitting and process recommendations for improvement and highlighted the need for continued monitoring throughout all coastal counties. With the use of digital and remote sensing devices, we will improve efficiencies in project evaluation to increase number of projects surveyed, advance survey efforts to better characterize infrastructure location and dimensions, and allow expansion of habitat field surveys to quantify beach environments in response to shoreline armoring. Advanced implementation, compliance and effectiveness surveys of HPA-permitted shoreline armor projects will further develop existing inventories, enhance impact analysis, and inform infrastructure decision-making, to improve outcomes on the ground while providing critical information to policy makers and planners.</p>	Department of Fish and Wildlife	Site specific	1	
2018-0912	Puget Sound Conservation District Stormwater Action Team	<p>Through this NTA, the Puget Sound Conservation Districts will provide regional stormwater impact through a coordinated service model of 12 districts working at the local level. This work will include the development of multi-cultural stormwater outreach through the Better Ground campaign, as well as high-profile events occurring in diverse communities across Puget Sound. Through a partnership with the Veteran Conservation Corps, the Stormwater Action Team will also provide the implementation of green stormwater infrastructure in priority areas of at least 4 districts.</p>	Puget Sound Conservation Districts Caucus	Site specific	1	
2018-0936	Habitat Needs of Species of Greatest Conservation Need in Imperiled Ecosystems: Prairie and Oak Woodlands of the Puget Sound Region	<p>Conduct pre and post restoration treatment surveys of select WDFW Species of Greatest Conservation Need (for example, Federal endangered Taylor's checkerspot, State endangered Mardon skipper, Oregon vesper sparrow, Island marble) which depend on the imperiled prairie-oak ecosystem. Evaluate the effects of prescribed fire, herbicide, seeding, and planting. Identify important areas for conservation through species surveys, habitat mapping, and habitat evaluation in order to help reduce land-conversion rates.</p>	Department of Fish and Wildlife	Site specific	1	

2018-0940	Improving Reporting of Illicit Discharges to Reduce Risk of Stormwater Pollution	The work proposed is to develop and field test methods for improving and streamlining data collection for illicit discharges and illicit storm sewer connections. The methods will compliment other guidance and help make data more accurate and more efficiently collected and reported. Such methods are necessary to assist NPDES permittees and other stormwater managers with the more stringent requirements for "illicit discharge detection and elimination" (IDDE) in the forthcoming 2019-2024 NPDES permits. The project will build off a region-wide evaluation of over 47,000 records of illicit discharge data (City of Lakewood, 2017), where it was found that key information was routinely missing. By collecting better data to inform spending on stormwater management, this project will help diminish the risk of toxic pollution entering creeks, rivers, lakes, groundwater, and Puget Sound.	Aspect Consulting	Site specific	1	
2018-0945	Develop an outfall strategy for Puget Sound	Develop strategies to reduce the potential impacts of wastewater outfalls through (1) improving reliability of wastewater treatment with improved monitoring and alarms, (2) exploration of alternative wastewater disposal methods to reduce impacts such as consolidation or relocation of outfalls or switch to land application, and (3) improving treatment to reduce viral and other health risks. Efforts would emphasize education and outreach assistance in the planning process to reduce the size of Prohibited areas and reduce pollution impacts to Puget Sound.	Department of Health	Site specific	1	