APRIL 2018

Pathogens Prevention Reduction and Control 1-4 (PC-00J32601)

FINAL REPORT

Overview

In February 2011, the Environmental Protection Agency awarded the first round of funding through a Lead Organization Cooperative Agreement to the Department of Health (DOH) in support of Puget Sound Estuary Ecosystem Restoration and Protection. This document and the supplemental materials provided serve as this agreements final report. Please note that "Rounds 5/6" of the Pathogens Prevention Reduction and Control Lead Organization work falls under a separate cooperative agreement {PC-00J88801} and that agreement ends in August 2019. The work of these agreements fall under a six year strategy which allowed DOH as a Lead Organization to work with the EPA, Puget Sound Partnership (PSP), Northwest Indian Fisheries Commission (NWIFC) and other Lead Organization agencies to develop and manage projects in alignment with the Puget Sound Action Agenda. Over six years and two cooperative agreements more than 160 projects were sub-awarded with over 20 million dollars invested.

This work has remained dedicated to the prevention and reduction of pathogen pollution in Puget Sound through the management of human and animal waste. Pathogens present a public health risk through consumption of shellfish and contact with polluted waters during recreational activities. Restoring shellfish growing areas, avoiding shellfish closures, and protecting people from disease served as the primary objectives of this Pathogens agreement. This document, and related appendices, serve as the final report for "Rounds 1-4" which ended January 31, 2018.

The Department of Health acknowledges and thanks the many people and organizations that contributed to this effort. Executing and delivering the work under this grant was possible through strong partnerships with organizations around Puget Sound.

In particular we wish to acknowledge both former and current staff within the Office of Environmental Health and Safety including: Maryanne Guichard, Jerrod Davis, Mary Knackstedt, Blake Nelson, Mark Toy, Stuart Glasoe, Megan Schell, Andrea Hood, Tracy Farrell, Kirsten Weinmeister, Emily Sanford, Nichole Simmons, Todd Phillips, Rick Porso, Scott Berbells, Jerry Borchert, Lawrence Sullivan, Jean Snyder, Trevor Swanson, Denise Lahmann, John Eliasson, Jeremy Simmons, Lynn Schneider, Randy Freeby, Debby Sargeant and Julianne Ruffner.

The directors and staff of each of the twelve local Environmental Health Jurisdictions as well as other county departments, tribes and non-profits who play a role in coordinating successful Pollution Identification and Correction (PIC) and On-site Sewage System local management programs.

Our Environmental Protection Agency Project Officers including: Michelle Wilcox, Chris Castner, Bill Zachmann, Catherine Gockel and Taylor Biaggi as well as the rest of the Puget Sound Team at Region 10.

The staff leads of the other six organizations with whom we coordinated and collaborated and Tom Gries at the Department of Ecology for his role in coordination of quality assurance for our sub-recipients and Ron Cummings at the Department of Ecology for his role in review and approval of Ag BMP installations, and Amy Jankowiak at the Department of Ecology for her role as the No Discharge Zone Project Lead.

Background and Approach

With the objective of reducing sources of pathogens and preventing associated diseases and illnesses, the Pathogens LO invested in the following programmatic areas:

- Inventory, inspect and fix failing on-site septic systems
- Pollution Identification and Correction (PIC) programs
- Monitor and notify public of health threats via the Beach (Environmental Assessment, Communication and Health program (BEACH) in partnership with the Department of Ecology
- Inspect farms and implement livestock best management practices (BMPs)
- No Discharge Zone petition and increase the number of boating pump out stations
- Research and Data Management

Approximately two thirds of the Pathogens grant budget invested in local programs and practices to improve management of OSS, livestock, sewage from vessels and other pollution sources. In addition to these investments, funds were also utilized to build regional infrastructure in support of local pathogen management programs.

The PDF of a PowerPoint presentation linked in the Appendix section below provides an overview of each of these investment areas and provides a highlight of project from each of these. Each of the above program themes align with strategies and sub strategies (as documented on our FEATS reporting form in 18.C) from the Puget Sound Action Agenda as well as three of the Puget Sound Vital Signs (bacterial standards met at Swimming Beaches, On-site Sewage System inspections and the acres of harvestable Shellfish Beds). The following Near Term Actions from the 2012 Action Agenda were supported by these efforts: B3.1.2, C1.5.1, C1.5.2, C5.3.1, C5.3.2, C5.3.3, NTA C7.1.2, C7.1.3, C7.5.2, C7.5.3, C9.3.1, C9.3.2, and C9.4.1.

Evaluation

Overall progress was measured in reference to the pathogen related Puget Sound Vital Sign Indicators (acres of harvestable shellfish beds, inspection of on-site sewage systems in marine recovery areas and the condition of swimming beaches). Other key outputs include the establishment of a Pollution Identification and Correction Program in each of the twelve Puget Sound counties, the number of priority swimming beaches monitored each year and the development of a No Discharge Zone petition for Puget Sound. This last action that has been identified in the region's Comprehensive Conservation Management Plan since the early 1990's.

Please see our final FEATS report for additional detail on each of these measures as well the final status of each task.

Conclusions

We kept to our work plan programmatic investments and themes as outlined. The following highlights serve as a snapshot of the successful work supported through this program and associated agreements:

—There are nearly 155,000 acres in Puget Sound from which shellfish can be grown and harvested directly by commercial shellfish companies. Ongoing pollution identification and correction programs and related activities funded by the NEP have empowered local health jurisdictions, state agencies, and tribes, nonprofits, residents and other local governments to protect and improve water quality in these areas to allow for safe shellfish harvest. Incremental net gains are made each year, as some previously restricted shellfish harvest areas are returned to safe water quality conditions for harvest. From 2007 through January of 2018 at total of 11,318 acres were upgraded and 6,298 acres were downgraded for a net total of 5,020 acres of improvement. Projected net increases for early FY18 may add approximately 1,000 more acres and one of the areas being actively pursued (Samish Bay) would add an estimated 4,000 acres towards achievement of the 2020 target of 10,800 acres.

— Drayton Harbor: 810 acres of Puget Sound shellfish beds in Drayton Harbor (near the U.S./Canada border) were re-opened in late 2016, enabling year-round commercial oyster harvest for the first time in 22 years. NEP contributed funding for pollution identification and correction programs to locate leaky septic systems, and that included support for local outreach and for farm planning capacity at the conservation district to work with farmers to reduce manure runoff. This story represents successful water quality improvement results achieved through long-term community-wide pollution reduction efforts.

— Quartermaster Harbor: Approximately 180 acres of commercial shellfish growing area were upgraded in King County's Quartermaster Harbor in 2016 following two years of NEP-funded pollution identification and correction program work as well as increased operation and maintenance of on-site sewage systems in the marine recovery area. Prior to the upgrade, Quartermaster Harbor shellfish beds had been closed to harvest for over 20 years due to fecal pollution. The main source of pollution was faulty or failing septic systems.

— Onsite Sewage System (OSS) Inspection/Correction Target: The Puget Sound Action Agenda's 2020 OSS target requires that all systems in designated Marine Recovery Areas (MRAs) or other high risk areas be inventoried, inspected and repaired when needed at a rate of 95%. As of June 2017, 44% of systems in MRAs and other high-risk areas have been inspected. Between 2011 and 2017 the Total OSS Inventory increased by almost 29,000 systems while the percent "Without Documentation" declined from 14% to 5%. Over the same time period, the number of OSS "Current with Inspections" increased by 17,000 while the percentage went from 31% to 44%. In addition, a regional low interest loan program has been established in Island, Jefferson, Kitsap, King, Thurston, Mason, Tacoma-Pierce, Snohomish, Clallam, and Whatcom Counties for OSS repair costs based on recommendations from the Septic Finance Advisory Committee's Financing Assessment, which was partially funded by NEP (see related resources and reports here). More Puget counties are expect to join in future cycles of the program.

— OSS Programs: NEP funds have supported OSS programs operating in ten Puget Sound counties. Funds focused on the targets of the OSS and Shellfish Vital Signs and implementation of the local management programs. In addition to funding local OSS programs, NEP funds have played a role in the following 1) directly funding OSS management programs, 2) exploring options to establish a sustainable regional funding source for the programs, and 3) establishing a regional loan program to assist homeowners with septic system repairs. The notably successful regional loan program, was established after a recommendation from the Septic System Finance project, won a state award from IACC and a national award from EPA.

— OSS O&M Best Practices: DOH finished a guidance manual on on-site sewage systems that is a reference manual on approaches and practices used in septic system management programs. While focused on the Puget Sound region, the manual is useful for practitioners and decision-makers involved in the design and implementation of these OSS O&M programs any place. The manual is another product and step toward the goal of instituting sustainable and effective management programs regionally, and eventually statewide.

— Outfall Strategy: The Washington State University (WSU) Stormwater Center completed a project in September 2016, collecting data from NPDES permit holders to develop a GIS layer of Puget Sound stormwater outfall locations and other attributes. The Stormwater Center worked closely with the Departments of Natural Resources (DNR) and Ecology to complete the project. Data and findings were presented to Ecology and DOH staff. Additional opportunities to present the data include pollution identification and correction (PIC) workshops and the Annual Education Conference (AEC). The AEC is the largest training for sanitarians in the state. DNR will add the dataset to the DNR Aquatic Marine Viewer. The data will help agencies and other stakeholders assess pollution impacts to Puget Sound shellfish and to other species and habitats.

— Pollution Identification and Correction (PIC) Programs: NEP grants support PIC programs operating in all 12 Puget Sound counties. These programs are essential to recover and protect shellfish resources, swimming beaches and water quality. Regional PIC workshops attended by staff from counties,

conservation districts, tribes, state and federal agencies and academia foster communication and opportunities to share best practices, technological advances and shared challenges and solutions.

— Livestock Manure Management: DOH provided NEP funds to the Washington State Department of Agriculture (WSDA) Dairy Nutrient Management Program (DNMP) between 2014 - 2016 to supplement agency work with local partners to identify and correct pollution from dairy operations and from application of dairy manure to agricultural lands in Whatcom, Skagit, and Snohomish counties. NEP funds augmented WSDA's capacity to collaborate with partners to conduct water quality sampling and follow-up investigations and to provide technical assistance and education/communication with the livestock industry. In Whatcom County, WSDA staff collected fecal coliform bacteria data at the U.S.-Canadian border to help characterize bacteria levels in water flowing into the US. WSDA DNMP inspectors conducted inspections at 97 dairies and 13 non-dairy manure applicators, issuing written notification of violations or warning letters to 52 dairies and 12 non-dairy manure applicators. WSDA DNMP inspectors referred 13 dairies to the local conservation districts and 41 non-dairy manure applicators to Department of Ecology. Twenty-seven dairies and five non-dairy manure applicators successfully implemented facility and management improvements. In the Portage Bay, Samish Bay and Lower Stillaguamish basins, DNMP staff conducted visual assessments of field conditions, nutrient applications and storage capacity for 120 manure lagoons. In addition, WSDA contacted managers of 555 acres in berry production to recommend manure management improvements through voluntary implementation of BMPs.

— Vessel Sewage Management: The Washington State Department of Ecology submitted a petition to establish a No Discharge Zone in Puget Sound with support from a Pathogens sub-award. In February 2017, the U.S. Environmental Protection Agency issued a final affirmative determination that adequate sewage pump-out facilities are available for recreational and commercial vessels. Following that determination, Ecology initiated a rule-making process. Ecology responded to over 26,000 comments on a draft No Discharge Zone petition - most of the comments received were supportive of the designation. Chapter 173-228 WAC was officially adopted on April 9, 2018 after a five-year public process. The rule became effective as of May 10, 2018 for all recreational boats after an appeal period. The NDZ is about 2,300 square miles in size. In addition to this, Washington's Parks and Recreation Commission installed or repaired pump-out stations in seven areas to protect water quality and shellfish harvest areas with Pathogen sub-awards.

— Pathogen Research, Reporting and Monitoring: DOH invested in research to improve understanding of pathogen and marine biotoxin threats to prevent disease outbreaks. Researchers deployed continuous temperature data loggers at more than 20 pathogen-monitoring sites in Puget Sound to understand relationships between temperature and disease occurrences (specifically, the bacterial pathogen, *Vibrio parahaemolyticus*). Data will help enable development of proactive, risk based monitoring and notification program to prevent disease from *Vibrio parahaemolyticus* illnesses when linked to the consumption of commercially harvested oysters. The 2016 work provided a water temperature network for tribes, the shellfish industry, and Health to use in implementing the revised

controls. This work will continue with non-NEP funding as DOH assess the effectiveness of the revised rule during the third year of implementation. DOH worked with the Northwest Association of Networked Ocean Observing Systems (NANOOS) to provide data collected from near real time loggers to the tribal, commercial, recreational and private shellfish harvesters through a web application.

— DOH has worked with IT staff to develop applications and databases for shellfish classification, water quality monitoring data, OSS inspection status, pathogen and biotoxins monitoring, BEACH monitoring and other key applications for tracking pathogen targets, preventing disease, and communicating with the public, shellfish growers and stakeholders. The data system was launched on DOH's website in June 2014. An example of the interactive Shellfish Safety Map for recreational shellfish harvest can be found here. In 2017 to-date the data system website had over 700,000 hits to the site, and it is the most popular site that DOH has.

— Freshwater Algae/Mussel Project: Cages of Pacific blue mussels (*Mytilus trossulus*) were deployed at the mouths of Puget Sound rivers to determine if the mussels can bioaccumulate microcystins (liver toxins) from freshwater algae blooms. These blooms can cause serious illnesses, killing wildlife and domestic animals. Data from this study was analyzed and a final report for the project completed. The study results showed freshwater-derived microcystins are polluting the Puget Sound land-sea interface. The freshwater origin of microcystins contamination in the study reinforces the importance of lake nutrient reduction and management efforts. It also highlights the connectivity of terrestrial, freshwater, and marine ecosystems.

— Policy Work: Along with several other state agencies, DOH participates in the Shellfish Coordination Group convened by the Governor's Shellfish Policy Advisor. The Shellfish Coordination Group participants identify barriers to and solutions for achieving successful water quality improvement and shellfish restoration work, particularly in geographic areas with high agricultural land use.

Course corrections including challenges and solutions, are addressed in our biannual FEATS reports for the duration of the agreement. These funds contributed to infrastructure of many local programs aimed at the uniform objective of improving and maintaining water quality sufficient to ensure public health.

Note: the work plan for Pathogens 5-6 (PC-00J888-01) largely continues and builds on these efforts (funding the same programmatic categories) and we'll be completing a final report for that agreement late summer/early fall 2019. In addition, the Puget Sound Institute has recently notified us that they will be conducting an analysis of the two agreements similar to the work done for the Marine and Nearshore Lead Organization. We do not yet have a timeframe for this work but expect it to be complete ideally within the close out for the 5/6 agreement.

Recommendations and next steps

As we look towards the future of National Estuary Program investments, there are many opportunities to build upon the infrastructure and programs supported via the Pathogens Prevention, Reduction and

Control Lead Organization and to apply lessons learned. In particular, as the region moved to a new funding and planning model the Department of Health was selected via a competitive process as the lead for the Shellfish Strategic Initiative. This new agreement (PC- 01J18001) is active from 2016 - 2021 and will implement priority near term actions from both the 2016 Puget Sound Action Agenda as well as the 2018-2022 Action Agenda. There is a large policy and planning component to this highly collaborative effort, which enables more comprehensive planning around the Shellfish Beds Vital Sign and more. The new planning model brings together and advisory team for structured decision-making (including around funding recommendations) and encourages a high degree of coordination amongst our partners and sister agencies.

Appendices

- Presentation to the Ecosystem Coordination Board (August 2017)
- Final Advanced Post Award Monitoring Review (September 2017)
- Link to agreement and sub-recipient materials

For more information:

https://www.doh.wa.gov/CommunityandEnvironment/Shellfish/EPAGrants

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This project is part of the **Puget Sound National Estuary Program**.

The National Estuary Program is a place-based program to protect and restore the water quality and ecological integrity of estuaries of national significance.

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